FOR RICHER FIELDS

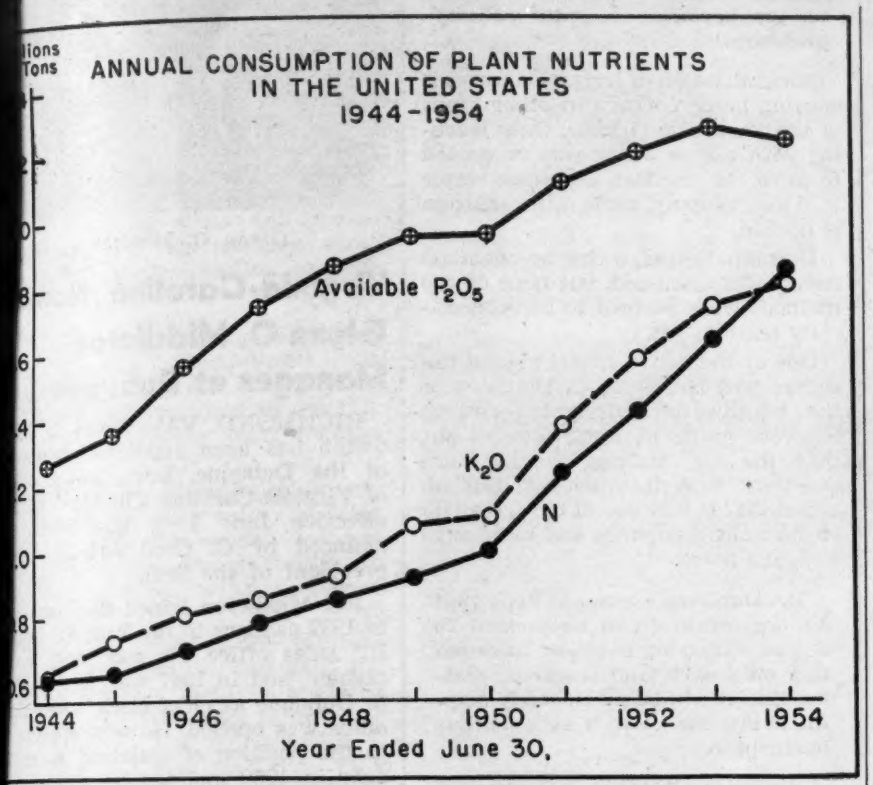
Croplife®

PUBLISHED EVERY MONDAY

WEEKLY NEWSPAPER FOR THE FARM CHEMICAL MANUFACTURER, FORMULATOR AND DEALER

Published by The Miller Publishing Co., Minneapolis, Minn.

Vol. 2 | Subscription Rates: $5 for 1 year, $9 for 2 years | MAY 30, 1955 | Acceptance under Section 34.64, P. L. and R. authorized. | No. 22



Fertilizer Tonnage Dips, But Nutrient Use Sets New Record in 1953-54

WASHINGTON—Tonnage of commercial fertilizer in the U.S. and territories dipped during the year ended last June 30, but consumption of primary nutrients set a new record for the 15th consecutive year, according to the annual fertilizer consumption report, issued by the U.S. Department of Agriculture.

The report was prepared by Walter Scholl, Hilda M. Wallace and Esther I. Fox of the Fertilizer & Agricultural Lime Section, Soil & Water Conservation Research Branch, Agricultural Research Service, USDA, at Beltsville, Md.

Highlights of the report appeared in last week's issue of Croplife. Following is the complete report:

For the year ended June 30, 1954, the consumption of fertilizers in the U.S. and territories amounted to 22,773,499 tons or 2.73% less than the consumption in 1952-53.

This quantity comprised 22,157,986 tons of products containing one or more of the primary nutrients (N, available P_2O_5, K_2O) and 615,513 tons of the secondary and trace element materials which did not contain primary nutrients. The consumption of these fertilizers was, respectively, 377,135 tons (1.67%) and 261,974 tons (29.86%) less than that in 1952-53.

Although the tonnage of fertilizers used in 1953-54 was lower than in 1952-53, a new record in total consumption of primary nutrients was set for the 15th consecutive year. Thus the consumption of these nutrients amounted to 5,895,558 tons, an increase of 4.42% (249,502 tons) over that in the preceding year.

The consumption of nitrogen increased 12.85% (210,360 tons) to 1,847,416 tons and that of K_2O 3.90% (67,792 tons) to 1,806,042 tons, whereas the consumption of available P_2O_5 decreased 1.26% (28,650 tons) to 2,242,100 tons. The content of total P_2O_5 in all fertilizers decreased 4.28% (118,317 tons) to 2,646,971 tons.

The average primary nutrient content of fertilizers bearing primary

(Continued on page 18)

Inside You'll Find

Construction Starts On Escambia Bay Petrochemical Plant

—SEE PHOTO ON PAGE 21—

PENSACOLA - MILTON, FLA. — Construction is under way for a petrochemical plant to be operated by Escambia Bay Chemical Corp. between Milton and Pensacola in Santa Rosa County, Florida.

Cost of the plant, including other facilities to be built later, will exceed $25,000,000. Civic and industry leaders from this area joined officers and directors of the Escambia Bay firm in official ground breaking ceremonies recently.

Using natural gas as the principal raw material, the Santa Rosa County plant will produce as much as 250 tons of anhydrous ammonia per day, from which a daily output of some 220 tons of nitric acid, 275 to 350 tons of ammonium nitrate and 200 tons of ammonium nitrate-ammonia fertilizer solutions may be developed.

The initial production of two primary units will be industrial chemicals, direct fertilizers and components for the manufacture of mixed fertilizers. Ashcraft-Wilkinson Co., Atlanta, have been designated sales agent for the fertilizer products of Escambia Bay Chemical Corp.

(Continued on page 21)

TVA to Auction Fertilizer Plant

CHATTANOOGA — The Tennessee Valley Authority has announced one of its fertilizer plants—Godwin Phosphate at Columbia, Tenn. — will be auctioned June 8.

The government agency reported it had earlier announced the plant and 406-acre site would be offered for sale, but at that time said TVA first would have to receive an offer from someone to buy "at an acceptable minimum price." It has since received such an offer, the agency reported, from a large chemical company.

TVA said its prospecting and mining programs in Middle Tennessee will continue to support its phosphate fertilizer and munitions development work at its chemical engineering research center at Muscle Shoals, Ala.

POTENTIAL OUTLINED

Research Group Sees Bright Future for Chemical Industry

NEW YORK—The chemical industry, including agricultural chemicals, can look forward to continued growth during the next five years, members of the Chemical Market Research Assn. said here May 19 at the group's annual meeting.

Increased fertilizer usage was predicted by Richard F. Messing, manager of the industrial economics department of Arthur D. Little, Inc., Cambridge, Mass., a research organization. The increase would occur, he said, despite an unchanged farm prosperity. Mr. Messing based his views on the fact that only about 25% of the country's crop land now receives any application of fertilizer.

Fertilizer usage in many areas remains considerably under that which would represent either optimum economic performance for the

(Continued on page 21)

Seasonal Price Squalls Seen For Nitrogen

Farm Income Dip Adds to Squeeze In Supply-Demand

By JOHN CIPPERLY
Croplife Washington Correspondent

WASHINGTON—Seasonal summer price squalls are now indicated for nitrogenous fertilizer materials, according to information reaching here, as it now becomes evident that a supply-demand squeeze is making itself felt.

Government officials here, speaking to Croplife, indicated that reports that the steel industry contemplated price reductions in solid nitrogen products were correct but that the

(Continued on page 17)

Bids Asked for Spruce Budworm Control in West

MISSOULA, MONT. — The U.S. Forest Service is sending out bid invitations for spray operations and a supply of chemical spray mixture for a spruce budworm control program in the service's region 1 with headquarters here.

P. D. Hanson, regional forester, said the three year aerial spray program eventually would extend over 2,000,000 acres of timber in Montana and Northern Idaho.

Assigned first priority for the program were three units—the Bitterroot consisting of 105,000 acres in the east and west forks of the Bitterroot River south of Missoula; the Gardiner comprising 58,000 acres in the Yellowstone National Park area; and the Swan River area southeast of Kalispell, Mont., extending over 75,000 acres of the Flathead National Forest.

Spruce budworm infestation has reached epidemic proportions in Douglas fir stands, Mr. Hanson said.

Sulfur Production

WASHINGTON—The domestic sulfur industry produced 434,568 long tons of native sulfur and 32,300 tons of recovered sulfur (of a purity of 97% or greater) during March, according to reports of producers to the Bureau of Mines, U.S. Department of the Interior. Producers' stocks of native sulfur decreased from the previous month and at the end of March totaled 3,090,897 tons.

INSECT, PLANT DISEASE NOTES

See Page 4

Arid Lands Conference Gives Promise of Increased Use of Chemicals to Reclaim Deserts

ALBUQUERQUE — New and increasing markets for agricultural chemicals were forecast at the International Arid Lands Conference held here recently. Attendance was more than 2,000.

Fifty-nine scientists from 25 nations assembled on the campus of the University of New Mexico under sponsorship of the American Assn. for the Advancement of Science, to discuss ways and means of making the world's wastelands produce more food for rapidly-expanding populations.

One third of the earth's land surface now either arid or semi-arid, could be developed for use as pasture and range land, they declared. Chemical fertilizers, applied to range land, have paid dividends. Weed-killers are being used to destroy aquatic plants that clog irrigation canals. Insecticides have proved their worth against grasshoppers and other pests that attack forage plants, the scientists said.

Water was a critical factor in all discussions. Some sessions dealt directly with it and covered such topics as rain-making, irrigation, estimating underground resources, and desalination of sea water. Conservation of existing water resources was also a major subject.

Can a reservoir be coated with a substance that would prevent evaporation? Australia is testing detergents in this regard, said Dr. B. T. Dickson, retired chief of the Commonwealth's division of plant industry. Evaporation can be stopped by a monomolecular film, he says, but tests have not reached the practical stage yet.

Can chemicals be used to kill weeds in irrigation ditches without eventually harming crops? L. N. McClellan, assistant commissioner and chief engineer of the U.S. Bureau of Reclamation, said experiments with miscible oils and aromatic oils show promise.

Another reclamation specialist, E. W. Elliott of Albuquerque, told how 2,4-D amine salt was being used successfully to kill salt-cedars in the Rio Grande River between Belen and Elephant Butte Dam.

Small airplanes have sprayed 2,4-D in droplet form to some 20,000 acres of shrub-clogged swamps in the San Marcial area of the river. The planes applied about two pounds of 2,4-D to the acre. The substance was mixed with 5 gal. water, ½ gal. diesel oil and a small portion of emulsifier.

Ground spraying rigs were also used. Large tank trucks, equipped with pumps and booms, permitted more intensive and more controlled application in areas where neighboring crops and useful trees had to be avoided.

Mr. Elliott, who is in charge of reclamation's maintenance and drainage division of the Middle Rio Grande Project, also discussed use of soil sterilants, employed principally to keep weeds away from structures.

He found sprayed materials superior to pellets because the latter do not permeate arid soil as well as they do in humid areas.

Forest Service officials told how chemical sprays were being used to eliminate sage brush, also. Eradication of such gives valuable range grass a chance to return and provide fodder and check erosion.

Herbicides are also used against mesquite and junipers. One study showed that an acre that included 176 junipers produced only 51 lb. grass fodder. A nearby acre where trees had been removed, provided 240 lb. feed.

Turning from water-saving measures, the scientists considered ways and means of making the most of what nature provides.

Finding the best types of plants for various climatic conditions was a major topic, of course. But more than one agronomist stressed that "creating a favorable environment" for plants (principally through fertilizers) was important, too.

As stated by Dr. R. Merton Love, University of California agronomist: "There is no question of economic returns resulting from fertilization of unimproved ranges."

He described experiments in arid sections of California which showed the value of phosphorus and sulphur compounds in increasing the yield of resident legumes. Other tests used nitrogen fertilizers alone or in combination to increase the total production of forage and provide feed earlier in the season.

"In extensive tests, Martin and Berry found that yields of meat could be increased from two to five-fold," Dr. Love said. "The poorer the soil, the higher the increase in productivity."

He cited the example of one farmer who seeded and phosphated 350 acres in 1953 at a cost of $8 an acre. The net return was about $10 an acre the first year. A herd of 700 beef animals had access to the improved range for 50 days in the spring and averaged 46 lb. more than a comparable herd on unimproved range, he said.

R. O. Whyte, however, stressed that many backward areas of the world cannot afford fertilizer yet and must build themselves up economically from local materials before achieving commercial status.

Dr. Whyte, who is with the Food and Agriculture Organization of the United Nations in Rome, cited a belt of arid land "used and misused for centuries" stretching from Portugal to Pakistan. Some of this is man-made desert and could be returned to productive use by shelter-belts, water-spreading, reseeding, soil-building, and strict range management, he said.

Reseeding must be accomplished on a wide scale, however, according to Wayne Kessler, Arizona range specialist. Where livestock have a choice of forage, they eat the more palatable plants first and this ultimately favors the survival of undesirable and wasteful plants. C. S. Christian, officer in charge of Land Research Section for Australia, pointed out that wise use of fertilizers will help beneficial plants in their competition against weeds. He urged more ecological research and cost studies.

Botanists and ecologists turned to the problem of drouth resistance in plants. Both Dr. F. W. Went of Caltech's Earhart Plant Research Laboratory and Dr. Michael Evenari of Israel's Hebrew University, said they believe that plants can be modified in this regard by chemical treatment.

"Put potassium on plants and their transpiration goes down," said Dr. Went. "Germinate certain seeds in salt solution and for some time the plant will lose less water than comparable plants."

They suggested that basic research along these lines would lead to useful knowledge in plant breeding and conditioning.

Dr. Evenari also spoke of experiments in Israel to combat the rapid formation of a hard crust characteristic of some desert soils. After a rain, some crusts form so fast that seeds cannot sprout. He described tests with soil conditioners and also suggested that seed-conditioning sometimes accelerates germination enough to meet the crust problem.

Several sessions were devoted to salinity problems. As one example, P. J. Lyerly of the Texas Agricultural Experiment Station at Ysleta said that acreage in cultivation in Hudspeth County Reclamation and Conservation District No. 1 will be reduced about one half this year because of lack of satisfactory water or because of acute salinity problems.

Mineralization of irrigation water is causing much concern in other areas of the lower Rio Grande. Only leaching with excess water was suggested to solve the problem. But since water is in short supply, some other solution is needed.

De-salination of water by chemical means was discussed, but none of the methods were deemed to be economically feasible yet.

One of the active spirits behind the conference, Dr. Peter C. Duisberg of the Southwestern Irrigated Cotton Growers Assn., El Paso, pointed out that the big meeting raised more questions than it answered. But he added that it was useful for scientists of different disciplines and nations to compare notes.

Dr. Duisberg expressed hope that an organization can be formed to act as a clearing-house of information on desert land research, stating that it will be particularly helpful if laymen as well as scientists participate.

"Too often scientists pursue a problem by continually narrowing their field of study," he said. "We need to have other citizens along to remind them of the purpose of the study in the first place."

The scientists spent four days at the University of New Mexico, then took a two-day tour of the drouth areas of the Southwest. Conferences were then held for three days at New Mexico Institute of Mining and Technology at Socorro.

Supporting the meetings were $6,000 raised by local farmers and businessmen, plus grants from the National Science Foundation, the Rockefeller Foundation, and the United Nations Educational, Scientific and Cultural Organization.

UNESCO's advisory committee on arid zone research held its first American meeting in conjunction with the conference.

Robert Q. Parks Named General Sales Manager Of Grace Chemical Co.

MEMPHIS—Robert Q. Parks has been named general sales manager of Grace Chemical Co. Since joining Grace Chemical in early 1953, Dr. Parks has been serving as manager of agricultural services.

Prior to his association with Grace Chemical, he was head of soil management and irrigation agriculture for the U.S. Department of Agriculture in Beltsville, Md. He was earlier connected with the Ohio Agricultural Experiment Station at Wooster; the U.S. Plant, Soil and Nutrition Lab at Ithaca, N.Y., and the USDA research division at Auburn, Ala.

Educated at the University of Arizona and Ohio State University, Dr. Parks is a member of the International Society of Soil Science; the American Society of Agronomy and the Soil Science Society of America.

NEW PACKAGE

WILMINGTON, DEL.—A new 2-lb. package of "Lignasan" fungicide, blue stain control chemical for lumber, has been announced by the Du Pont Co.

Glenn O. Middleton

Virginia-Carolina Names Glenn O. Middleton Manager at Dubuque

RICHMOND, VA.—Glenn O. Middleton has been appointed manager of the Dubuque, Iowa, sales office of Virginia-Carolina Chemical Corp. effective June 1, it has been announced by C. Cecil Arledge, vice president of the firm.

Mr. Middleton joined the company in 1937 as clerk in the East St. Louis, Ill., sales office. He soon was made cashier, and in 1947 was transferred to Dubuque as chief clerk when that office was opened. He was appointed to the position of assistant to manager in 1950 and has served as assistant manager since 1952.

A native of Carbondale, Ill., he received his education in the local school and attended the University of Southern Illinois. Mr. Middleton succeeds Harold S. Vorhes, who recently resigned to form his own company.

At the same time Mr. Arledge announced the appointment of C. Aubrey Clayton to the position of assistant manager of the Dubuque office. Mr. Clayton has been associated with V-C for four years as salesman at the Memphis office. He is a graduate of Alabama Polytechnic Institute, Auburn, Ala.

Program Set for Fertilizer Safety Session in Virginia

RICHMOND, VA.—A session on fertilizer safety will be included in the 21st Virginia Statewide Safety Conference scheduled to be held here June 2-4. William C. Richardson, Southern States Cooperative, Richmond, will preside as chairman of the fertilizer section June 3. Co-chairmen of the section are Curtis A. Cox, Virginia-Carolina Chemical Corp., Richmond, and Vernon S. Gornto, Smith-Douglass Co.,-Norfolk, Va.

Ralph J. Crosby, assistant vice president of Marsh & McLennan, Inc., New York, will appear on the meeting program. Topics to be covered in the session include "The Relationship of Accident Prevention to Performance Efficiency," "The Basic Principles of Successful Accident Prevention" and "The Importance of Accident Investigation."

The afternoon program will continue on the fertilizer safety theme with topics being covered as follows: "Opportunities That Supervisors Have to Eliminate Accident Causes," "Avenues of Approach to Correction Action" and "The Qualifications of a Supervisor Applied to Accident Prevention."

VA Not Competing With Industry, hairman Says

AZOO CITY, MISS.—The Tenssee Valley Authority is not comting with private industry for fertzer markets, Gen. Herbert D. Vo, chairman of the TVA board of ectors, told agricultural specialss and farmers from eight states. He made the declaration in an adess before members of a Mississippi ate College - TVA - sponsored farm dy tour of 16 counties.

Agricultural specialists and farm eaders of Arkansas, Alabama, eorgia, Kentucky, North Caroina, Tennessee, Virginia and Missippi made the 900-mile jaunt study farming operations, fertlizer demonstrations and coopratives which are working with he agricultural extension service nd TVA.

"TVA has a minor role in the fertizer business," Gen. Vogel said. t produces only 4% of the plant od value manufactured in the U.S. d only 2% of the total tonnage lume."

Instead of competing with private dustry for fertilizer sales, the TVA airman said, the agency "cooperes with other manufacturers to lp them produce better fertilizers r farmers."

Gen. Vogel stressed the military lue of TVA plants, and said the gency's fertilizer facilities could be nverted to production of nitrates nd phosphates for munitions in a ngle day. He also said that TVA rtilizer is supplied at price advange to farmers only for test demstration purposes.

econd Edition of Chemical Facts Book ow Available

WASHINGTON — The second edion of "The Chemical Industry Facts ook" was published recently by the anufacturing Chemists' Assn. The 60-page work contains 15 chapters nd is well illustrated with charts, raphs and tables. One 14-page chapr deals with chemicals and crops. About 100,000 copies of the first lition, published two years ago, ere distributed.

According to the publisher, the secnd edition is more complete than he first, offering an additional 52 ages of information, including such atures as a listing of trade associtions and professional societies idenfied with chemical manufacturing. The single-copy price of the Chemal Industry Facts Book is $1, postge prepaid. Discounts are available n bulk quantities. Headquarters for he association are at 1625 Eye St. W., Washington 6, D.C.

ames A. McCoubrey Research Post with orth American Cyanamid

TORONTO—North American Cyamid, Ltd., has announced the apintment of Dr. James A. McCoubrey as manager of its newly formed arket research department.

Prior to joining North American yanamid, Dr. McCoubrey served ith the research department of hawinigan Chemicals, Ltd. He will nduct market surveys to provide inrmation for decisions on plant exnsion, product diversification, and e development of new products in anada.

OFFICE MOVING

BURLINGTON, ONTARIO — The merican Potash Institute's Canadian fice is moving to 342 Brant St. re.

Fertilizer, Pesticides Ranked with Top Chemical Developments

WILMINGTON, DEL.—Compounds that enrich the soil, control insects and contribute to increased meat and dairy production rank among the most useful chemical developments of the last 35 years.

That's the word of a panel of nine experts, distinguished in the fields of science, education and publishing, who were asked to make the selection to mark Chemical Progress Week, May 16-21. The results of their survey appear in the May-June issue of "Better Living," the Du Pont Co. employee magazine.

In all, 27 developments were singled out by the panel. Synthetic fertilizers, synthetic insecticides and feed compounds were placed among the 10 most useful developments. Leading the list were synthetic fibers, antibiotics and synthetic plastics.

Davison Appoints Two Research Men

BALTIMORE — Pierre F. Gunder and James A. Long, Jr., have joined the Research and Development Division of the Davison Chemical Co. Division of W. R. Grace & Co.

Mr. Gunder has been assigned to the research engineering department at the company's Curtis Bay Works in Baltimore. He completed his work for a degree in chemical engineering at the College of the City of New York after having spent 2½ years in the army chemical warfare service. Since leaving school, Mr. Gunder has worked with the design and development agency of the army transportation corps board, and with National Lead Co.

Mr. Long has been assigned to the development department at the company's Baltimore office. Mr. Long was in the armed services from January, 1941, to January, 1946, when he was discharged with the rank of major in the engineers' corps. He then attended Lehigh University where he obtained a B.S. degree in chemical engineering. Since graduation Mr. Long has worked with the Barrett Division of Allied Chemical & Dye Corp., Luken's Steel Co., and W. C. Hamilton & Sons.

Northeastern Phytopaths Schedule Meeting

WEST SPRINGFIELD, MASS.—The annual winter meeting of the Northeastern Division of the American Phytopathological Society will be held on Nov. 3-4 at the Eastern States Farmers Exchange, Inc., West Springfield, according to B. H. Davis, professor and research specialist in plant pathology at Rutgers University, New Brunswick, N.J. Mr. Davis is secretary of the division. Program details will be worked out presently, Mr. Davis said, and announcements will be made at a later date.

INSECT AND PLANT DISEASE NOTES

Armyworm Outbreak In Southeast Virginia

BLACKSBURG, VA. — Virginia's first definite armyworm outbreak of the year has been reported in southeastern Virginia. Damage reported so far has been only to oats, but other small grains may be attacked. If the worms remain unchecked, serious damage can be expected. Toxaphene, TDE, DDT, and methoxychlor at about the rate of 2 lb. actual material an acre should control the worms effectively.

Alfalfa weevil infestations continue to be reported from additional counties. The number of truck-crop and garden insects is increasing and will continue to do so for the rest of the season. Flea beetles seem to be causing the most concern to growers on the Eastern Shore.

Weevils, Other Pests Plague Maryland

COLLEGE PARK, MD. — Alfalfa weevil larvae continue to feed on unprotected alfalfa in many sections. Damage to the second growth by larvae and new adults has been noticed in various localities on the Eastern Shore.

Pea aphids are light on the Eastern Shore, but still quite heavy in some fields in central Maryland. Spittlebug adults were found in Worcester and Wicomico Counties. Damage by spittlebugs should soon be over. As yet no serious armyworm infestations have been seen or reported, although Delaware and Virginia have reported damage. Grain fields all over the State should be watched closely for infestations. Cutworms reported damaging corn in Dorchester County.

Colorado potato beetles and flea beetles are active on potatoes and tomatoes on the Eastern Shore. Bean leaf beetle and Mexican bean beetle are doing damage to snap beans on the lower Eastern Shore. Flea beetles are present on sweet potato foliage in Wicomico County, and it will soon be time for gold beetles.

Vegetable weevil damage to tobacco in beds has occurred on a number of farms in Calvert County. Use DDT or lead arsenate for its control.

Cattle have been observed running from heel flies in Washington County. Sprays are not effective against these flies. Provide shade or ponds for protection of animals.—Theo. L. Bissell and Wallace C. Harding.

Corn Borers Begin To Stir in Iowa

AMES, IOWA — European corn borers are developing about 2 weeks ahead of last year. Present indications are that we should have first eggs in central Iowa by June 1. There will be corn tall enough to be attractive.

Half grown armyworms are feeding in oats and bromegrass. No serious damage has been noted yet. Reports and observations indicate spotty cutworm damage by black and dingy cutworms to newly-sprouted corn in Page, Tama, Grundy, Union, Harrison, and Monona Counties. Worms range from 2nd to 4th instar. Damage includes leaf feeding and cutting off of plants above and below ground level.

A big hatch of grasshoppers has occurred in southern and western Iowa. Up to 10 per square yard in pastures and thin hay fields, up to 20 per square yard in field edges, lawns, and gardens. Major species is the lesser migratory grasshopper, with 10% two-stripe grasshopper.

Potato flea beetles are attacking potatoes and Colorado potato beetles are also out feeding on potato leaves. Clover mite is doing damage on apple trees in western Iowa. European red mite eggs are hatching, and aphids and leafhoppers are damaging roses.

Stable flies are beginning to appear. In southwest Iowa there was an average of 1 per animal this week. Fly numbers will continue to increase. Horn flies continue to increase in numbers. They now range up to 150 per animal in southwest Iowa and 100 per animal in central Iowa.

Cattle grub adults, often called heel flies, have been "goading" cattle considerably in many parts of Iowa. There is no positive method of preventing this.—Harold Gunderson.

Minnesota Reports Pests Developing

ST. PAUL, MINN. — Codling moth adults have emerged and were trapped in large numbers in southeast Minnesota May 18-20. Plum curculio adults have been found in the Twin Cities area and in south-east Minnesota. Some curculio damage was found on first cover stage apples in the LaCrescent (south-east Minnesota) area.

During the week May 15-20 grasshopper egg surveys were continued in Central and Northwest Districts of Minnesota. In Anoka, Sherburne and Morrison Counties considerable hatch and some spraying have already been carried out. Farmers in these counties have been alerted to the importance of the problem. In Todd County (central Minnesota) hatch of Melanoplus bivittatus and M. mexicanus was light, but warm weather the latter part of the week was expected to accelerate development.

European corn borer pupation averaged 37% on May 20 in Cottonwood, Murray and Nobles Counties (south-west Minnesota). Approximately 1% emergence was observed in these counties. Pupation averaged 39% in Martin and Faribault Counties (south-west Minnesota) on May 20, but no adult emergence was noted.

Red-Banded Leaf Roller in New Jersey

NEW BRUNSWICK, N.J. — Red-banded leaf roller egg masses are mostly hatched in southern New Jersey and codling moth emergence is noticeable around packing sheds in that area.

Onion maggot damage has been heavy throughout the state, where earlier warnings were disregarded. Adult flies were still found on onion plantings in South Jersey on May 13th and thrips have moved in heavily on bunching onions.

Armyworm activity is being reported in some parts of the state and barley growers have been urged to watch for this pest.

Downy mildew has been found in spinach in parts of Cumberland county. Growers are advised to pick as quickly as possible in any field where the mildew is present. — Leland G. Merrill, Jr. and Spencer H. Davis, Jr.

Cotton Pests Show in Georgia This Week

ATHENS, GA. — Boll weevils have begun to show up on young cotton in South Georgia. Although hibernation studies conducted by Dr. C. M. Beckham, Entomologist, Georgia Experiment Station, Experiment, showed very light carry-over of weevils, we should be on the lookout for possible moderate to heavy infestations in localized areas.

Inspections for weevils in seedling cotton are made by examining 100 plants while walking across a field

an average of 1 weevil per 100 ants is found, an early season application of insecticide may delay the ne when mid-season applications ll be necessary. Insecticides recommended for early season weevil control include aldrin, BHC, dieldrin, drin, heptachlor and toxaphene.—R. Jordan.

reat Insect Activity arks Illinois Report

URBANA, ILL.—Corn borer development is still approximately two eeks earlier than normal. In the uth third of the state, pupation is most complete and moth emergence as begun; in the central third, pupaon varies from 50 to 75% and an casional moth has emerged; in the orthern third, pupation is from 40 60% complete except in the extreme northeastern section, where it aries from 25 to 40%.

In much of Illinois, moth emergence may occur the first two weeks in June, at which time corn will not be favorable for borer survival.

Adult chinch bugs are killing oat lants and occasionally wheat plants some fields in eastern Illinois and re depositing eggs that should begin hatch this week.

Moderate numbers of armyworm oths are still noticeable around ights at night in central Illinois, nd occasional small armyworms can e found in rank grains and grasses hroughout the central section. In outhwestern Illinois, armyworms ange in size from small to nearly ull grown. Although the infestation s spotted, a few fields warrant an pplication of dieldrin or toxaphene. Whether or not parasites and diseases vill help to control this generation f armyworms cannot yet be determined.

Nymphs of tarnished plant bugs are becoming very abundant on clovers and alfalfa. Although control measures may not be necessary at present, second growth of alfalfa and clover may be damaged.

Damage by lesser clover leaf weevil hows as wilting stems in fields of ed clover and ladino. Early fields of orn may be attacked by cutworms, lso.—H. B. Petty.

Armyworm Abundant In Missouri Fields

COLUMBIA, MO.—Armyworms in arley are reaching the critical stage. Although the worms are still small, even the small ones will start cutting heads as soon as the grain begins to turn. Farmers were being warned not to wait too long before spraying barley. Toxaphene, 2 lb. an acre or dieldrin at 4 oz. an acre, is being recommended.

Grasshopper business is picking up. In the drier sections of the state, those rains of last week seemed to step up the hopper hatch. We are still expecting grasshopper trouble this year. If it is another dry summer, you can expect a lot of trouble. It now becomes obvious that last fall, the hoppers did not concentrate their eggs in the egg beds in the usual manner. They seemed to pick out any place that seemed suitable, and plugged a few eggs there. Although there are still normal egg beds in some places, by and large, the young hoppers are much more spread out than usual.

Some variegated cutworms are howing up in small grain. Most of hese will be called armyworms. When they are present in fields prayed for armyworms, you may ave some complaints about poor kills ince the worms will not be killed. These cutworms feed fairly close o the ground, and especially in rank r lodged grain, rarely get up on the oliage covered with insecticide. The ariegated cutworms are not numerous enough in most fields to hurt the grain. They may cause some damage to legumes in the grain.—Stirling Kyd and Geo. W. Thomas.

Fall Armyworm Invades Idaho

GRANGEVILLE, IDAHO — An invasion of army cutworms is threatening 50,000 acres of fall sown grains on the rich Camas prairie in this central Idaho county.

Between 200 and 500 acres of fall sown grain already have been plowed under in one area and Idaho County Extension agent George Cook said more plowing will be necessary. He said some fields already are reported beyond salvage.

Airplane spraying was being used by some farmers in an effort to combat the cutworms, but Dr. Hugh Manis, University of Idaho entomologist, called in for technical advice, said its effectiveness depended on growth and infestations.

He said there is no seed treatment of any value in controlling the army cutworms and that sudden warm weather could promote rapid emergence and cause a serious threat to crop production on the prairie.

Dr. Manis said up to 25 army cutworms per foot had been found in some fields.

West Tennessee Lists Its Insects

KNOXVILLE, TENN. — Roughheaded corn stalk beetle, also known as the sugar cane beetle, may give serious trouble this year, particularly in West Tennessee. This pest damaged young corn in scattered areas last year mainly in west Tennessee and some in middle Tennessee.

Elm leaf beetle and its accompanying larvae are expected to be wide-spread on elm trees for the remainder of the season. There will be three generations this summer.

Vegetable weevils have been found notching and eating in tobacco plant beds in the state. For control, cryolite, toxaphene or chlordane is recommended.—R. P. Mullett.

Apples Attacked by Curculio in Indiana

VINCENNES, IND.—The cool and moist weather has prolonged plum curculio activity on apples. Lead arsenate or dieldrin should be continued to be used in this cover spray as fresh egg laying punctures can still be found.

Larvae of red-banded leaf roller are now large enough so that they can be readily found where infestations are present. A few orchards in the Vincennes area have enough larvae present to warrant the use of TDE in this cover spray.

Codling moth eggs laid between May 5 and May 7 hatched at Vincennes (Knox Co.) on May 17. Eggs laid between May 8 and 14 are in the red ring stage. Oviposition for first brood moths in the orchards has not, as yet, reached its peak, but thorough protection for codling moth is needed from this date on. Approximately 50% of the moths in emergence cages had emerged as of May 16.

Weather conditions have not been favorable for increases in orchard mite populations; nevertheless, comparable heavy infestations of European red mites, that will likely increase rapidly, are now present on apple trees where no dormant sprays were applied.—D. W. Hamilton.

Grasshoppers Getting Under Way in New Mexico

STATE COLLEGE, N.M. — The yellow clover aphid has hit its stride now and has shown up in large numbers throughout the alfalfa growing

(Continued on page 17)

WORLD REPORT

Industry News from Everywhere

By GEORGE E. SWARBRECK
Croplife Canadian and Overseas Editor

The pattern of production in the British sulfuric acid business has changed remarkably as a result of the expansion undertaken in the past five years. The British had a sharp lesson in 1950 when they realized how dependent they were on imports of elemental sulfur.

So far as the manufacture of acid was concerned, 57% of the output was made from elemental sulfur, 5% from imported pyrites, 14½% from sulfur in spent oxides, 8% from sulfur in zinc concentrates, and 5½% in sulfur from anhydrite. Thus indigenous sources accounted for only 28% of the U.K.'s total production of sulfuric acid.

It was because these facts were staring them in the face that the British manufacturers started their program of conversion and reconstruction with the aim of reducing the dependence on imported sulfur in the elemental form. It was intended to increase the production of pyrites acid to 40% of total output, extend the capacity of spent oxide and anhydrite, and to restrict the use of elemental sulfur burning capacity to that needed to fill the gap between demand and the acid available from plant using other raw materials.

The program has been successful. The British Sulfur Corp. now reports that the proportion of acid made from elemental sulfur has fallen to 36%; that made from pyrites has risen to 32%; spent oxide acid accounted for 19%; zinc concentrates 8%, and anhydrite 5%. By 1956 the corporation expects that the proportion made from elemental sulfur will fall to only 23% while pyrites will provide 24% and anhydrite 18%.

Aid for India

A technical cooperation program was signed recently in New Delhi between the governments of the U.S. and India. Because local production and planned imports of nitrogen fertilizers fall short of India's requirements, it is proposed to acquire about 44,000 tons of fertilizer to meet th shortfall and so assist food producti in India.

To be acquired outside India, sub ject to adjustment within budgetar limits are 12,000 tons urea, ferti lizer grade, prilled or shotted 44-45% nitrogen; 14,000 tons am monium sulfate-nitrate, granular containing not less than 26% nitro gen of which not more than 7% i nitrate form; 16,000 tons am monium sulfate, white crystalline containing 20.5% nitrogen, an 2,000 tons nitro-chalk, ammonium nitrate limestone, pellets or granu lar, containing not less than 20.5% nitrogen.

The U.S. is to provide $4 millio for the procurement of the fertilize and for their transportation. The I dian government is paying a part the cost also.

Egyptian Policy

The Agricultural Credit Bank Egypt has agreed to buy 100,000 to calcium nitrate from the Suez Fe tilizer Co. at a price slightly low than that charged for previous d liveries. This will enable the bank continue the policy of reducing pric of chemical fertilizers to farmers, system introduced some months ag

The bank has also decided to pu chase fertilizers direct from supplie abroad in order to cut costs. A mi sion is to be sent to visit fertiliz producing countries with a view arranging imports at the most a vantageous terms.

The Suez factory is stepping up i output to meet the demand. In 195 the offtake was reported at 160,0 tons compared with 120,000 tons 1953.

Western Potash

Negotiations are reported to be progress between the Western Potas Co., a Canadian firm, and F. H. M Graw & Co. of New York in conne tion with the development of Wes ern's property in Saskatchewan.

Frank Welters, president o Western Potash, states that th McGraw firm and a group of Ameri can and Canadian industrial an financial firms may put up $17. million in order to allow the prop erty to be put into commercial pro duction with a potential output o potash of 1,000 tons a day.

However, before the go-ahead given several engineering studies ha to be made but it is expected that decision will be made before the fir week in July.

Phosphate Shipments

The British Phosphate Commissi reports that in the year ended Ju 30, 1954, the total amount of pho phate shipped from Nauru and Ocea Islands in the Pacific was 1,381,7 tons.

Of this total, 863,300 tons wen to Australia, 432,057 tons to New Zealand and 85,900 tons to the U.K In addition, the commissioners pur chased from the Christmas Islan Phosphate Commission 305,827 ton phosphate, all of which was d livered to Australia.

The U.K., under the terms of working agreement, is entitled to greater share of the Nauru-Ocea Islands supplies but the entitleme has never been taken up in full. T British preferred to draw their nee from North Africa because of t shorter haul.

However, rising prices in that ma ket may result in the British calli for their allotment in full and th in turn, may mean a general pri rise all around.

ARMY WORM INVASION

HAVANA, ILL.—Indications poi to a full scale army worm invasi in Mason County, Ill., according Earl B. Terwilliger, farm adviser.

Rain Peps Up Crops and Pastures In Mid-South

MEMPHIS — Rains in the Mi South have aroused crops of co cotton and soybeans from the spring beds and added length to pa ture grasses.

Weekly crop reports from exte sion officials of Alabama, Arkans Mississippi and Tennessee disclos that rains were general and hea enough to bring up spring crops whi had been dormant during the d weather of the previous two or thr weeks.

Extension officials in Alabam reported that cotton, corn and pas tures were helped most. Prolonge dry weather had threatened th state's crops, which had suffere a severe blow from the sprin freeze.

In West Tennessee, Judd Brook district agent at Jackson, sa "weather during the past week w beneficial for spring planting a most of the cotton crop has be planted.

"Corn planting is making go progress and more than half of t crop has been planted. Early co has some irregular stands due to t activity of cut worms.

"Small grains and truck crops a showing good growth and pastur are better than they have been many years. There has been mu activity in setting sweet potatoes a some tobacco has been set."

Rains in many parts of Mississip proved highly beneficial to all crop according to Agricultural Extensi Service specialists.

Late planted cotton and corn a expected to benefit especially, as a home gardens, pastures and tru crops.

Cotton planting was just abou completed throughout the stat and corn planting was reported a about 80% completed. L. H. Mose ley, district extension agent a Stoneville, said the rains wer badly needed to bring some la planted cotton to a stand.

In the South Mississippi tru crops areas, the rains are expect to improve both quality and produ tion from cabbage, beans, peppe tomatoes and other vegetables, cording to Chelsey Hines, extens horticulturist.

Statewide rains in Arkansas help germination of cotton and other cr recently planted, eased a mild thre of a spring drouth, but caught so newly-cut hay crops—such as oat on the ground, doing some damag

On the whole, the crop pict was good, said the Extension Servi

Cotton planting is practica completed in most of the major c ton-growing counties, with so fields already chopped.

About 90% of the rice acrea has been seeded. Soybean plantin continue, with late planting e pected.

In sections of South Arkans some fields of early corn were ported as knee high and a sm acreage was ready to be "laid by."

A report on the Bradley Cou tomato crop said tomatoes w doing "very well," and that ab 90% of the plants have been sta and tied. Small tomatoes have peared on plants in Ashley Cou said the Extension Service.

SOYBEAN DISEASES

WASHINGTON—About 50 dise attack soybean crops in the U.S., cording to the U.S. Department Agriculture. Estimates for the en country covering the 10-year pe 1942-51 show that annual loss amount to more than 31 mil bushels of soybeans, or approxima 12% of the crop.

Special Retail Section

Better Selling

Richer Fields for Dealers

A SPECIAL CROPLIFE DEPARTMENT TO HELP RETAILERS IMPROVE MERCHANDISING KNOW-HOW

Growing Fertilizer Sales Help Michigan Farm Service Firm Double Business in 10 Years

Richland Farm Service Co., Richland, Mich., has seen its business more than double in the past 10 years under the direction of its owners, Doyle and Carl Bauserman who took over the firm in 1945.

How these owners overcame the effects of a declining demand for coal, one of the earlier mainstays of the business, was related in a recent issue of "The Feed Bag," which tells the story of how the sale of anhydrous ammonia more than made up for losses sustained in the decline of the fuel business.

In fact, the article says, the total sales volume of ammonia has continued to forge ahead since July, 1953, when this line was first taken on. The Bauserman brothers look for it to become the most important adjunct to their $250,000 annual feed business.

The brothers have found that not only is the liquid fertilizer a profitable item in itself and fast growing in demand, but there is money in selling and leasing the applicators for it.

They have installed bulk storage of 80,000 gal. for the anhydrous ammonia. In addition, they have agencies for Gotcher, Hoosier and Dempster applicators. Sold outright, these bring $300 or more. They are rented to farmers at a rate of $1 per acre. Applications by Richland Farm Service customers have averaged 50 to 100 lb. an acre and the liquid fertilizer retails at $200 a ton.

Through educational efforts of Richland Farm Service and extension farm agencies in the state, it is not hard to convince farmers that anhydrous provides cheap nitrogen, since it contains 82½% of that element which becomes immediately available to the corn or whatever other crop it is used on.

The first year of operation, Richland Farm Survice sold anhydrous ammonia for 6,000 acres for a sales total that was edging its way well toward the six-figure mark. The owners expect the total to climb considerably this year and the demand has given them confidence to erect another bulk station, which was put into operation as a one-man installation this spring.

It is located approximately 30 miles from Richland to give the firm a new territory. The location is at Mendon, Mich.

The Bausermans claim one of their best moves was erection of a 45x70-ft. warehouse in 1953. This gives them storage for a growing business in conventional forms of fertilizer, of which they stock three brands. It also provides room for a well-equipped certified seed plant.

Several thousand bushels of these seeds are sold in the nearby area, which is a fertile general farming country, better than the average land area of Michigan.

These smaller items are displayed in or near the office where store traffic is greatest to provide many impulse sales.

About 1,000 tons of dry fertilizer are merchandised each year. Adding the anhydrous ammonia has been of advantage in extending fertilizer sales season since farmers begin buying the liquid ammonia in March for use on meadows, pastures, and grain crops and continue into June when it is used to sidedress growing corn.

The Bausermans believe firmly in the value of advertising and carry out a regular program. This includes a regular series of advertising spots on radio stations nearby; display advertising each week featuring items of current interest placed on the farm page of a daily newspaper in Kalamazoo, 10 miles away, and regular reminders in a neighborhood shopping guide.

The firm has few credit problems, trying to keep credits as nearly as possible on a 30-day basis. However, this is relaxed for customers with substantial standings as individual circumstances dictate.

Deliveries are made free anywhere within the store's area. Mobile units holding 1,000 gal. of liquid on four-wheel trailers are used for delivery of anhydrous ammonia.

REPLACE COAL WITH HOTTER ITEM—Doyle and Carl Bauserman, owners of Richland Farm Service Co., Richland, Mich., discuss sales of anhydrous ammonia, volume of which has more than offset shrinkage of solid fuel business.

Tetrakote Distributors Named by Douglas

ST. PAUL—Floyd R. Olsen of Farmers Union Grain Terminal Assn. and Earl W. Seldon of the Seldon-Watts Seed Co., St. Paul, have been appointed distributors of Tetrakote, new liquid protectant to prevent wheat infestation. W. C. McCaslin of Douglas Chemical Co., St. Paul, announced the appointments.

BUCKTHORN DRIVE

MADISON—An all-out drive is under way to rid Wisconsin of buckthorn—a bush responsible for the spread of leaf rust, a serious menace to oats. All farm groups are being asked to cooperate in the voluntary drive, says Earl Wade, University of Wisconsin plant disease specialist. The drive was agreed upon at a recent meeting of plant disease workers at the university and in the State Department of Agriculture. Leaf rust on oats, also known as crown rust, last year resulted in an estimated $3,000,000 loss to Wisconsin farmers.

SHOP TALK OVER THE COUNTER FOR THE DEALER

By EMMET J. HOFFMAN
Croplife Merchandising Editor

"But I can't afford to put on any more fertilizer. It costs too much to build a new milkhouse, I just don't have enough money."

These are typical comments heard by dealers in the tight farm cost-price squeeze. Farmers are shying away from buying the things they need—many don't even wish to borrow the needed cash. But John Doneth, Michigan State College agricultural economist, says farmers are erring in being too conservative in use of credit.

Mr. Doneth mentions one Michigan farmer that spent only $500 for fertilizer in 1952 on 250 acres of cropland. Soil tests showed this was not enough. He doubled his application the next year and last year he spent $2,000 of borrowed money. By deciding to go into debt, this farmer increased his profits in the last couple of years while most farm earnings have been dropping.

Mr. Doneth thinks that many farmers are using makeshift operations where they are in a position to get a loan and go on to bigger or more efficient operations.

A rule of thumb sometimes used was that total indebtedness may approach one half the total assets of the business. That figure has been revised somewhat because of present price levels to 40% indebtedness, Mr. Doneth adds.

Dealers, because of their constant contact with farmers, can be influential in passing out some sound advice when the occasion presents itself. Again paraphrasing Mr. Doneth, farmers should not overestimate future income; they should not underestimate expenses, and they should allow enough leeway for poor crop years and low prices.

Dealer Promotion

Here's good luck to an association which is wisely embarking on a promotion campaign to help its dealer members sell more products. It's good to hear reports of an increasing number of these campaigns because it indicates an awareness of dealers and manufacturers of spreading the benefits of agricultural chemicals to farmers.

The Great Plains Agricultural Ammonia Assn., according to Barney A. Frankl, president, has hired the L. W. Ramsey Advertising Agency to prepare advertising and merchandising material and to coordinate publicity projects in behalf of agricultural ammonia.

Objectives include stressing the value of a balanced fertilizer program based on soil testing for maximum benefits from nitrogen application. All items being prepared will be such that the member's name and brand can be featured. The first promotion kit has already gone out to members and kit No. 2 will be presented as part of the association's Midwest Trade Show program scheduled for Des Moines and Ames, Iowa, July 20-21.

By RAYMOND ROSSON
County Agent, Washington County, Tenn.

Today, 87 years ago, was our first Decoration or Memorial Day. He was the young man or husband, perhaps a father, who left his plow in the furrow; his books on the desk; his hammer on the bench or his business on Main St., and marched away for us. He had grave responsibilities.

Who's Who may have us listed, or we may live in the last house up the hollow or on the half section over the river or maybe on East End Blvd. In any case, our responsibilities are great.

As advisers (and that is what good dealers are and the same thing applies to county agents) we need to prove to our fellows that we at least have more than one talent. We are all salesmen, in a way, but don't you think we need to look "out yonder" when we advise or when we sell a farmer a ton of fertilizer or some certified seed. We must think about, "How much good will the advice or merchandise do?" "Will it help to grow better alfalfa or grass or grain, to make cheaper milk, beef, pork or eggs?"

"Will it help to build soil? (Conserving soil only means to keep it as it is). Let's build it and it will help to establish homes, build schools, support churches, erect hospitals, organize the rural communities and develop leaders to work, play and worship together. Remember, "From good acres, big cities grow."

P.S.—Bill: You know my dealer told me the same thing my county agent told me. Well, why not?

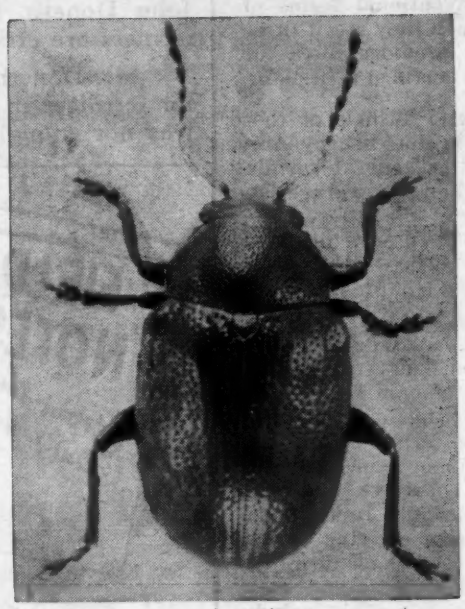
MORE FARM PRODUCTION

WASHINGTON—Today 8½ million U.S. farm workers are producing more than 13½ million workers did 30 years ago. Production per man-hour has more than doubled.

BUG OF THE WEEK

Mr. Dealer--Cut out this page for your bulletin board

Rose Leaf Beetle



How to Identify

The rose leaf beetle is a small, oval-shaped metallic-green beetle, about ⅛ in. long. They are most numerous in suburban gardens near uncultivated fields. They usually appear late in May or early in June.

Habits of Rose Leaf Beetle

Actually, little is known about this insect, but it is believed that the larvae live in the soil and feed on the roots of various plants beneath the surface. The beetle's scientific name is Nodonota puncticollis (Say).

Damage Done by Insect

In addition to feeding on roots in the larval stage, the rose leaf beetle, as an adult, feeds on a number of flowers in addition to roses. It attacks iris and peonies and also on the tender shoots, flowers and foliage of crops such as blackberries, raspberries, strawberries, clover, peaches, pears and plums. Frequently the beetles swarm over flowers and in a very short time riddle them with shot-like holes, thus retarding growth of the plants and making them unfit either for marketing or for esthetic enjoyment.

Control of Beetle

According to literature on the subject, no satisfactory control for the rose leaf beetle is known. Dusting with 5% DDT has been effective, as has the application of pyrethrum. The difficulty, however, lies in actually reaching the bugs with the dust or spray. Many of the pests are working within the buds or flowers and ordinary means of application of insecticide frequently fail to contact the culprits. Some of the literature advises jarring the bugs into a pail of water covered with a film of oil, or by picking the beetle-infested flowers and dropping them into the container. Early morning or at dusk is described as being the best times for such operations.

Illustration of rose leaf beetle furnished Croplife through courtesy of U.S. Department of Agriculture, Washington, D. C.

Previous "Bug of the Week" features are being reprinted in attractive 24-page booklet, priced at 25¢ single copies; reduced rates in quantities. Write Croplife Reprint Dept., Box 67, Minneapolis 1, Minn.

igh Soil Fertility Is ust for Championship rops, Grower Says

CHICAGO—America's wheat king ys that high soil fertility is a ust" for growing championship ops.

Elson Baur, of Unionville, Mich., ports too, that good seed and good anagement methods are equally portant. Mr. Baur won the wheat own at the International Grain and ay Show in Chicago last December. s entry of Yorkwin wheat, a soft nter variety, took first honors nong hundreds of samples shown by merican and Canadian growers.

The soil management program on Mr. Baur's 154-acre farm, includes utting plenty of organic matter nto the soil by growing legume rops regularly, adding fertilizer ontaining nitrogen, phosphate and otash, returning crop residues to he soil and using manure from 18 airy cattle.

Mr. Baur follows a five-year rota- on which gives his soil the benefit sweet clover or red clover two ears out of five. The organic matter om the legumes gives "push" to the il, keeps it loose and grainy and onditions it for top yields, he says.

The cropping sequence is beans, heat, beans, corn, oats, sweet clover red clover. Mr. Baur seeds the ts and wheat with sweet clover and ows under the "green manure" the ext spring.

He is a steady user of fertilizer. He adds nutrients to each of the crops in the rotation. For the en- ire rotation, his fertilizer use will un well over 1,000 lb. per acre.

For his championship wheat, he sed 300 lb. 3-12-12. The beans get 75 lb. 3-12-12; corn, 300 lb.; oats, 50 lb.; and the clover crop, 250 lb. er acre.

The prize-winning wheat crop av- raged 50 bu. to the acre. The 1954 ields of other crops were equally gh. Mr. Baur reports his corn crop veraged 126 bu. per acre, oats 80 bu., nd beans 25 bu.

ertilizer Prescriptions Help Produce ig Corn Yields

MADISON — Soils scientists are riting "fertilizer prescriptions" that ave helped Wisconsin farmers grow to 220 bu. corn per acre.

Such yields are reported by the niversity of Wisconsin, in summariz- g the 1954 results of the Wisconsin acemaker Corn Club. This club was tarted three years ago with the aim helping corn growers to reach ields of 100 bu. or more per acre.

Last year, 690 corn growers in 34 Wisconsin counties averaged 113 bu. per acre in the Pacemakers' program.

The highest yield was 220 bu. per cre, harvested by Lawrence Gunnel- on, of Dane County. Another Dane ounty farmer, Joseph Caine had a ield of 216 bu. Robert Schwaller, of aCrosse County, with 208 bu. per cre. Twenty-two other farmers aver- ged 160 bu. or better.

In the Pacemaker club program, ach member sends soils samples om his farm to the University for nalysis. The agronomists then write "prescription" telling the grower hich plant nutrients are needed by e soil to produce top corn yields, hat fertilizer to apply and how best care for his crop.

Corn Growers Exceed $100 An Acre Profit From Fertilizer Use

ST. PAUL—Some Minnesota corn growers made more than $100 per acre in net profit from fertilizer use last year.

Erling Burtness, of Caledonia in Houston County, was one of these growers, reports Dr. W. P. Martin, head of the University of Minnesota's agronomy department.

Mr. Burtness grew 161 bu. corn per acre on fertilized soil in the 1954 Extra Corn Yield Contest. His yield on unfertilized land was 68 bu. per acre. Thus the increase from the use of fertilizer was 93 bu. per acre.

Those 93 extra bushels were worth $139, figuring corn at $1.50 per acre, says Dr. Martin. The fertilizer cost $22 per acre, giving Mr. Burtness a net return of $117 per acre.

HORTICULTURIST NAMED

NEW BRUNSWICK, N.J.—Rutgers University trustees have approved appointment of Dr. William E. Snyder as profesor of ornamental horticulture at the College of Agriculture. Dr. Snyder holds a similar position at Cornell University. He will finish his duties there this spring and then fulfill previously made commitments to visit horticultural stations and nurseries in England, Scotland, France, Germany and Holland and to attend the International Horticultural Congress in Holland.

Soil Testing Gains in Arkansas

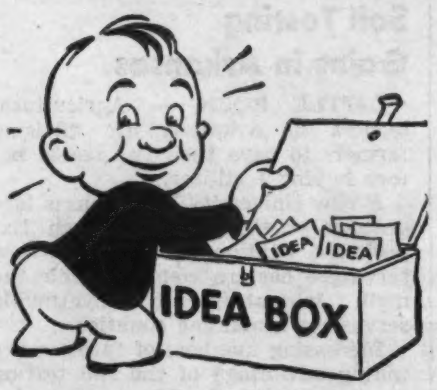
LITTLE ROCK — Agricultural leaders in Arkansas are advising farmers to have their soil tested before buying fertilizer.

A new University of Arkansas laboratory at the Cotton Branch Experiment Station at Marianna now serves 26 eastern counties while the main laboratory at Fayetteville serves the remaining counties.

Increasing numbers of farmers are taking advantage of the soil testing service. During the 12 months prior to Nov. 1, 1954 there were 30,321 samples analyzed by the two laboratories. This is about twice the number analyzed in the previous 12 months, according to Woody N. Miley, extension soils specialist.

Better Selling

Richer Sales Fields for Dealers



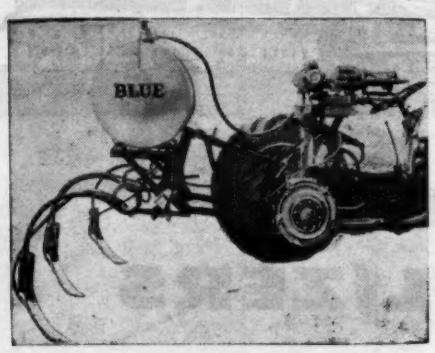
What's New...

In Products, Services, Literature

You will find it simple to obtain additional information about the new products, new services and new literature described in this department. Here's all you have to do: (1) Clip out the entire coupon and return address card in the lower outside corner of this page. (2) Circle the number of the item on which you desire more information. Fill in your name, your company's name and your address. (3) Fold the clip-out over double, with the return address portion on the outside. (4) Fasten the two edges together with a staple, cellophane tape or glue, whichever is handiest. (5) Drop in any mail box. That's all you do. We'll pay the postage. You can, of course, use your own envelope or paste the coupon on the back of a government postcard if you prefer.

No. 6252—NH₃ Applicator

The John Blue Co. has recently announced the addition to its line of a new series of tractor mounted anhydrous ammonia applicators for use with rear mounted tool bars. Tanks (with capacity up to 100 gal.) are mounted directly on the tool bar. The Blue metering pump is mounted directly over the rear axle housing where it is accessible to the operator. The firm's line of applicators includes the spring tine which is suitable for



side dressing and top dressing requirements and the more durable spring trip shank, which is suitable for tougher ground. Available for the first time is a line of rigid, truss frame type shanks for tough soil conditions where excessive deflection is a problem. These applicators will fit any size tool bar from 1¾ inch to 2¼ in. Tractor mountings are also available. To secure more complete information check No. 6252 on the coupon and mail it.

No. 5163—Gross Bagger

A new two-color data sheet, offered by the Richardson Scale Co., describes and illustrates the company's manually-operated gross bagger. Equipped with an automatic cut-off device, this recently-developed bagger scale fills and weighs either textile or multi-wall paper bags in capacities of 50 to 140 lb. To secure a copy of the data sheet check No. 5163 on the coupon and drop it in the mail.

No. 5175—Fly Control Products

The special products division of Mutual Products Co. has announced a new line of fly control chemicals. All products in the line carry the name of SK Surekill Brand. They are available in one, five and 53-gal. metal containers with tamper-proof pouring spouts. The 55% Malathion concentrate is available in pint bottles. For those who prefer to use Malathion in a granular form, five, 10 and 25-lb. moisture-proof packages are available. National distribution is planned. Secure more complete details by checking No. 5175 on the coupon and mailing it to this newspaper.

No. 6251—Row Planter Attachment

The E. S. Gandrud Co., Inc., announces that its new row planter attachment eliminates mixing of insecticides with fertilizer and applies dry granular insecticides during planting. The attachment mounts on either 2- or 4-row planters. Designed

to mount between seed cans, the unit delivers metered quantities of dry granular chemicals to the fertilizer boots through flexible metal tubes. Adapters connect insecticides and fertilizer tubes. A split sprocket clamps to the fertilizer drive shaft to drive the chemical applicator. A gauge on the chemical hopper allows setting of various application rates. Secure more complete details by checking No. 6251 on the coupon and dropping it in the mail.

No. 6253—Herbicide

Available in limited quantities is the new herbicide, Amino Triazole, produced by the American Cyanamid Company's agricultural chemicals division. A leaflet suggesting its use on Canada thistle, quack grass and other weeds is available. The company states that it has been granted acceptance of an "experimental label" which permits the firm to sell small quantities for testing purposes. To secure more complete details about securing a quantity of this herbicide, cost and available literature check No. 6253 on the coupon and mail it to this newspaper.

No. 6236—Soil Cover

A new type vinyl plastic soil cover under the name of Larvacovers, for use in chemical and steam sterilization, is announced by Larvacide Products, Inc. The "life expectancy" of this new type cover is claimed to be increased significantly by a florist green tint coloring which increases resistance to deterioration from sunlight. Heavy duty, 8-gauge plastic film is used. The cover is manufactured specifically for use in chemical and steam soil treatment. However they may be used also in irrigation ditch lining, water conservation, erosion prevention and in temporary greenhouse construction. More information is available without charge. Check No. 6236 on the coupon and mail it.

No. 5174—Bag Printing

Samples of bag printing using the "texture" process as well as the half-tone method are available from the Fulton Bag & Cotton Mills. The company's texture process is known as Ful-Tone printing and is for use on multiwall paper bags. The reproduction of natural, lifelike pictures that result in more realism is claimed for the texture process. To secure samples of both methods of printing check No. 5174 on the coupon and mail it.

No. 6241—Soil Fumigant

Nemagon, a new soil fumigant for control of nematodes, which is said to have great stability in the soil, is now available for limited commercial use, it was announced by officials of the Agricultural Chemicals Division of Shell Chemical Corp. The product has been tested on cotton, grapes, citrus, and other tree crops such as peaches and walnuts. Some crops appear tolerant enough of this chemical so that applications can be made around the roots of the living plant, it is claimed. With established trees, applications of five to 10 gal. per acre have been used for control of a wide variety of nematodes to a depth of 4-6 ft. Nemagon (1, 2-dibrome, 3-chloropropane) is currently being manufactured on pilot plant scale. Both liquid and dry formulations are being marketed. The product will be available for limited sale this season on such crops as citrus, cotton, and grapes. Nation-wide marketing is expected in 1956. To secure more complete details check No. 6241 on the coupon and mail it.

No. 5182—Grain Protectant

A new liquid grain protectant claimed to be the first product of its kind for the prolonged protection of stored grain from insects, has been introduced by the Douglas Chemical Co. Called Tetrakote, the protectant is being placed on the market after several years of cooperative research with the entomology department of Kansas State College. Tetrakote is applied to the grain as it is harvested and is moved to farm storage. It is a residual spray which is said to give protection to the grain for periods up to 12 months at a low cost. The formula consists of ethylene tetrachloride, petroleum distillate, piperonyl butoxide and pyrethrins. Tetrakote is being marketed to farmers and grain men through feed stores

Also Available

The following items have appeared in the What's New section of recent issues of Croplife. They are reprinted here to help keep retail dealers on rotational circulation informed of new industry products, literature and services.

Send me information on the items marked:

☐ No. 5096—Viscosity Chart	☐ No. 6242—Weed Killer
☐ No. 5108—Lease Plan	☐ No. 6243—Catalog
☐ No. 5163—Gross Bagger	☐ No. 6245—Insecticide
☐ No. 5174—Bag Printing	☐ No. 6248—Anhydrous Folder
☐ No. 5175—Fly Control	☐ No. 6249—Metering Device
☐ No. 5182—Grain Protectant	☐ No. 6250—Fungicide
☐ No. 6234—Weevil Control	☐ No. 6251—Planter Attachment
☐ No. 6236—Soil Cover	☐ No. 6252—NH₃ Applicator
☐ No. 6241—Fumigant	☐ No. 6253—Herbicide

NAME .....

COMPANY .....

ADDRESS .....

CLIP OUT—FOLD OVER ON THIS LINE—FASTEN (STAPLE, TAPE, GLUE)—MAIL

FIRST CLASS PERMIT No. 2
(Sec. 34.9, P. L. & R.)
MINNEAPOLIS, MINN.

BUSINESS REPLY ENVELOPE
No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY—

Croplife

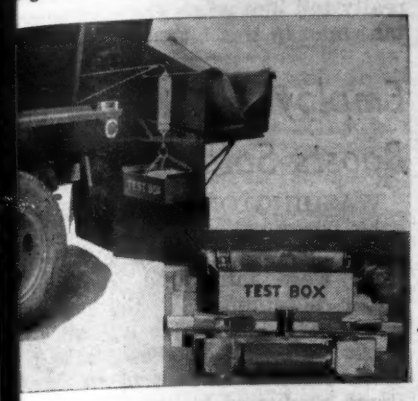
P. O. Box 67,

Reader Service Dept. Minneapolis 1, Minn.

elevators and other farm retail outlets. It is commercially applicable in terminal and country grain elevators, mills, seed houses, bean plants, rice and hominy mills. It may be used on any grain, rice, beans, popcorn and garden and field seeds. For complete information regarding the sale or use of these products please check No. 5182 on the coupon and mail it.

No. 6249—Metering Device

The Highway Equipment Company, Inc., is producing a new metering device for commercial fertilizer spreaders. The unit fits all late model "New Leader" agricultural spreaders made by the company. The device measures the amount of fertilizer being fed to the twin distributor discs



and provides a simple method of obtaining the correct feedgate setting. It is said to be easy to install and accurately meters from 100 lb. per acre on up. Full information and prices may be had—at no obligation—by checking No. 6249 on the coupon and mailing it to this newspaper.

No. 6242—Weed Killer

The Pacific Coast Borax Co.'s agricultural sales division announces the introduction of DB-Granular, a weed killer designed for agricultural weed problems including deep-rooted noxious perennial weeds. The product is a complex of disodium tetraborate and 2,4-dichlorophenoxyacetic acid. This new herbicide is applied in dry form just as it comes from 50 lb. multiwall paper sacks. DB-Granular for agricultural use is a companion product to the company's new Urea-por introduced recently for industrial weed problems. To secure more complete details check No. 6242 on the coupon and mail it.

No. 6248—Anhydrous Ammonia Folder

"Mathieson Anhydrous Ammonia" is the title of a four-page folder published by the Olin Mathieson Chemical Corp. which answers a number of questions farmers ask about nitrogen for direct application to the soil: What is anhydrous ammonia? What happens in the soil? When should it be applied? How much should be applied? Copies of the folder are available without charge by checking No. 6248 on the coupon and mailing it to this newspaper.

No. 6245—Insecticide

Methyl parathion, an organic phosphate insecticide recommended for the control of insects and mites on cotton, now is available in commercial quantities from Monsanto Chemical Company's organic chemicals division. The compound is said to be effective in controlling the various species of aphids and mites when properly formulated and applied either as a liquid or a dust. It also is of value for boll weevil control. The properties of methyl parathion are similar to those of parathion, Monsanto's Niran. It has essentially the same order of toxicity as the latter, and equal care is necessary in the handling of it. Samples of methyl parathion, information on its properties and instructions for safe handling, formulating and applying the material are available on request. Just check No. 6245 on the coupon and drop it in the mail.

No. 5096—Viscosity Chart

A viscosity conversion chart for quickly translating any viscosity measurement into seven other standard units has been reprinted for distribution by Nopco Chemical Co. The conversion nomograph was designed to minimize problems caused by lack of standardization in measurement methods of various industries. It is intended for rapid estimation rather than extreme accuracy. To obtain a copy of the chart check No. 5096 on the coupon and drop it in the mail.

No. 6234—Alfalfa Weevil Control

A two-color mailing piece on alfalfa weevil control with heptachlor is available to insecticide formulators, distributors and dealers. The 8½ in. by 11 in. piece folds to handy mailing size and is ready for immediate use. Ample space is provided for dealer imprinting if desired. The folder tells actual case histories of heptachlor use in alfalfa country along with rates and methods of application. For a free supply check No. 6234 on the coupon and mail it.

No. 6250—Antibiotic Fungicide

New literature on Acti-dione, an antibiotic fungicide, has been prepared by its manufacturer, the Upjohn Co. Acti-dione ferrated is said to be an all-purpose product for controlling dollar spot, brown patch, melting-out and fading-out. The literature states that it "has not been found to kill bacteria when applied at recommended fungicidal strengths." Included in the literature are leaflets showing the control possible in the above four major bent grass diseases and the dosage schedule for the product. Information about the Upjohn product, Actispray, a fungicide for the treatment of cherry leaf spot on bearing cherry trees, is also available. Secure the literature by checking No. 6250 on the coupon and mailing it to this newspaper.

No. 5108—Lease Plan

Under a recently inaugurated lease plan, material handling equipment manufactured by Barrett-Cravens Co., may be leased for three years or five years to responsible companies. The plan is not primarily a tax-saving device, but all monthly payments that the customer makes are fully deductible for federal income tax purposes, a company announcement states. There is no option to buy the equipment either during or at the end of the lease. The lease does contain an option for the customer to extend the lease at the end of the three-yar or five-year period. Available for lease are: hand lift trucks, electric lift trucks, pallet lift trucks, fork trucks, industrial tractors, skids, portable elevators and cranes, storage racks and material handling specialties. More information on the plan may be obtained by checking No. 5108 on the coupon and dropping it in the mail.

No. 6243—Chemicals Catalog

A revised edition of the Antara Chemicals catalog is now available. Information on chemical composition, physical properties and application is given on established products and new chemicals released in the past few months. The catalog includes a listing of intermediates, as well as detergents, wetting agents, emulsifiers and other chemicals. For a copy of the new catalog, check No. 6243 on the coupon and drop it in the mail.

The Bulletin Board

No. 9 in a series from the Spencer Chemical Company Magazine, "Today's Fertilizer Dealer"

Fertilizer dealer Ellis Mueller of Calamus, Iowa, weighs test plot corn with help from Chuck Monson (left) and Dick Balser (right), Spencer representatives. Read below how Mueller makes test plots pay.

Use Test Plots to Sell Fertilizer

By Chuck Monson
Spencer Representative for Iowa

When your wife is told by a salesman, "This washing machine gets out more dirt with less soap," she may want to see it to believe it. It's the same with fertilizer—**nothing** can beat the living proof. Test plots **sell** fertilizer, and with only slight effort on your part.

All it takes is sound planning, a little cooperation and a small expenditure. Ask Ellis Mueller. This Calamus, Iowa, dealer has been laying out plots for years to prove this point, with the aid of a fertilizer supplier and a good customer.

And what could be better for all concerned? The farmer gets some bonus bushels and probably some free fertilizer. The dealer has a new salesman (in the plots), and the supplier makes out in the long run! Of course, a good crop year helps—but it's not essential.

Last year, a poor season, Ellis's heaviest fertilized plot produced $24 more corn (above the fertilizer cost) than the unfertilized check.

How can you set up a test plot in your area? Here are some helpful tips from Lloyd Dumenil of the Soils Department at Iowa State College:

"The simplest test on a field to be fertilized is to leave an unfertilized strip and then double the rate on an adjoining strip. Fertilizer rates and the effect of combinations also can be shown." (Ellis Mueller used one check plot and four combinations of mixed fertilizer and Ammonium Nitrate.)

"Plan your demonstrations carefully," urges Dumenil. "Don't omit a treatment needed to show fertilizer balance. And don't forget that other production practices such as stand level or insect or weed control may affect fertilizer increases.

"Locate your test plots so people can see and visit them easily. Signs will help. And take time to show the tests to your farmer-cooperator and other potential customers.

"Finally, you can harvest your demonstrations and use the data in your sales talks and advertising. You'll give your customers an unbiased picture if you harvest **all** your tests instead of only the spectacular ones.

"All of you with fertilizer experience know that fertilizer results vary widely. You'll have some tests that show little or no profit, but you'll be able to show your customers that the proper use of fertilizers is profitable over the years."

Doing Business With Oscar & Pat

When Oscar came back from lunch that warm spring day, he found Squeak Cadle, the thin-faced married employee, standing in the salesroom with a saw in his hand. Rotund, sharp-eyed Oscar noted that there were some stacks of lumber lying on the floor—new lumber, too—some of it 12 inch wide stuff, and some 1x2 inch material.

A big counter had been stripped of stock, which now stood in an aisle nearby. Frowning, Oscar approached Squeak. "What's goin' on here, anyway?"

Squeak, who was noted for his slow motions, his habit of sizing up a job before tackling it, gave Oscar a tantalizing look. Finally he spoke up. "Pat told me to rig up an upper structure on this counter. Wants it for a display of some sort."

Oscar snorted. "With new lumber? Why—why that stuff's good enough for the new parsonage. Ach, that looks like No. 2 pine. Sells for about $120 a thousand feet. Himmel—" he clapped his hands to his head. "That Pat—how he spends money! Thinks it's easy to get like salt."

Squeak grimaced. "I dunno. I didn't order it. I'm only takin' orders. I got an order to build this rack, and that's what I'm gonna do." He started measuring with a steel tape.

Oscar's face got red. Tillie Mason, the plumpish bookkeeper, sensing a battle coming up, reached for an ulcer powder and chewed on it. Those powders always helped her control a squeamish stomach when Oscar and Pat quarreled. "Don't you build it!" Oscar snapped. "I'm telling you to stop!"

Squeak looked up in disgust. "One of you guys says to build it, the other says stop it. Why don't you guys get together and make up your minds? If this keeps up I'm gonna take that milk truck job at the dairy. Gettin' so I don't know who I'm working for here."

"Well, stop this work right now and get back into the warehouse," shrilled Oscar. "We are not going to spend all this money for expensive lumber — just, just for a display. We've been havin' too many displays around here anyway. And that, that experimental garden outdoors, and all that. It's drivin' me crazy."

Squeak Cadle took one look at Oscar, then at the warehouse, then turned to Tillie. "Make out my check, Sis," he growled. "I'm going to work at the dairy. I've had enough of this."

For once Oscar looked surprised. He was still more surprised when Squeak walked up to him. "You know already what I think of you and this job, Oscar," he snapped. "Well, since there are ladies around I can't tell you the way I'd like to. But I think you know what I would say if I could!" With that Squeak turned on his heel and strode out of the store, leaving Oscar blinking.

When Pat came whistling back to work after lunch, he found Tillie typing letters and Oscar sitting at his desk figuring discounts, his lips tight.

"Say," said Pat puzzledly. "Where's Squeak? He's supposed to be building a display. Looks like he hasn't started yet."

"No," said Oscar sternly. "And he won't start. I ordered him to stop, and he got mad and quit. He's a hothead."

"You told him to stop? Why?"

Oscar coughed. "Because that—that good lumber is too expensive, that's why. Always building displays, always running up the costs? Why don't you let everything go along as it is for a week, or even two weeks—if you can stand it that long?"

Pat McGillicuddy frowned. "So that's it, Oscar. You've got pocketbookitis again, begorra. And you told Squeak to stop building that rack because that lumber looks expensive. Well, we can't use cheap, old lumber, that's certain. And you could let me explain my display idea first. There's only about $8 worth of lumber there."

"Somebody's got to save the money around here!" snapped Oscar.

"Yes," fired back Pat McGillicuddy angrily," and somebody's got to make it!"

The two partners glared at each other. The ringing phone saved the situation. It was Farmer Jones calling about a bill Oscar had sent him, charging him 6% interest because his bill was 15 days overdue. When Oscar had reluctantly agreed to waive the interest charge if Jones got his check in the following day, the matter was apparently settled.

By this time Pat had cooled down a little. "This display of mine," he said evenly, "will definitely boost our sales. I plan to thumbtack those excellent Bug of the Week sheets that are appearing in Croplife onto that 12 inch wide board. That will call the attention of the farmers to the fact that this is bug season and they should prepare for the battle."

Oscar sniffed. "Huh," he said, "you don't need a special table for that. And you don't need 12 inch wide lumber. You can tack the Bug of the Week sheets on the wall. That'll be just as good."

"No it won't," Pat said determinedly.

"Why not?" Oscar's jaw locked as stubborn as Rocky Marciano's just before Round 1 in a championship fight.

"Because," Pat said softly, "I am going to place a can or package of insecticide right below each poster. That insecticide will be just the one for that particular bug's funeral, whether it is the European corn borer or the Gypsy Moth."

"Huh," said Oscar frowning, "and you think that will help sell more insecticides."

"Why not?" asked Pat. "The farmer will look at the bug poster, recognize the bug and its crop danger qualities, then see the insecticide which will put the bug away—permanently. The farmer will feel like buying. That's making it easy for him to buy."

"Well," conceded Oscar gloomily. "It might be worth trying—once!" Then he looked up sharply, almost excitedly. "Say we can use 1x2 inch strips for that counter top framework and thumb tack the bug poster in the top and the bottom. We can set the strips about 12 inches apart. That will do it."

"Maybe," said Pat, "but how about this lumber. We'll have to send back the 12 inch wide stuff. I hate to do it. The lumberman is one of my best friends."

"I'll send it back," Oscar said almost gleefully. "I don't mind calling him—or anybody, for that matter. And say, I've got some 1x2 inch stuff in my garage. Left over from last summer when Minnie made me build a lattice for her. I'll sell that lumber to the company, Pat, at a 10% discount."

"All right, all right," Pat said resignedly. "Now let's get one of the other men in here to measure up, get your lumber and get started on this display. We want to sell some merchandise."

Oscar's eyes glowed. Said he to himself, mentally licking his chops, "Pat got the idea, but I trimmed it down to size. If I wanted to, I could really tell him who's the most important man in this business. I—."

Employee Participation Boosts Sales Output

WASHINGTON — Participation of sales personnel in work improvement programs, when new handling practices were introduced, resulted in wider acceptance of the improved work methods, better utilization of work time, and increased sales per clerk hour, according to an experiment conducted by the U.S. Department of Agriculture.

Emphasis on employee participation was followed by increased sales of $4.96 per clerk hour when improvements or changes in grocery handling methods were introduced in retail grocery stores. Under this method, employees of five supermarkets viewed a motion picture on improved retail grocery handling practices, participated in an open discussion on the subject at a conference in the company's office, and received published material and discussed it with their manager at the store.

In two other methods of introducing the same work practices among comparable groups of five stores more traditional methods of training were followed and the results in increased productivity were not so great. A gain of $3.47 per clerk hour occurred when store managers met with their supervisor at a special meeting on grocery handling, viewed a motion picture on the subject, and were given copies of published material to discuss with and distribute to their clerks. A gain of $1.33 in sales per clerk hour followed when memoranda and published material on improved grocery handling were mailed to store managers for discussion and distribution to their clerks.

Spencer Employees Top Blood Donor Quota

PITTSBURG, KANSAS — Employees of the Spencer Chemical Co. here April 27 gave 134 pints of blood during the visit of the Red Cross bloodmobile. The quota was 125 pints. This was the 13th visit of the bloodmobile to the plant and the thirteenth time the blood donor quota has been exceeded. Spencer employees have given 1,793 pints of blood to the program since 1949. There are 2... employees who are members of the "gallon club" and several are near the 2-gallon donor total.

GRASSLAND PROGRAM

MADISON—Twenty five Wisconsin counties will take part in the 195... Wisconsin Grassland Farming Program, reports Vic Burcalow, forage crop specialist at the University of Wisconsin. This year the program will not be competitive. Instead, recognition will be given to farmers in the program who produce at least 2,500 lb. feed nutrients or 4,000 lb. milk per acre of pasture.

FARM SERVICE DATA
Extension Station Reports

Plowing under phosphate and potash fertilizer for corn in the fall can be more profitable than disking in the plant food in the spring, according to Lloyd Dumenil, Iowa State College agronomist.

Corn yields increased 29 bu. per acre in four 1953 Iowa tests from plowing under 400 lb. 0-20-0 fertilizer, compared with a 25-bu. increase from disking-in the same quantity of fertilizer in the spring.

In seven other tests, in 1952, corn yields increased 17 bu. per acre when 200 lb. 0-20-0 fertilizer was fall plowed. Broadcasting in the spring at the same rate on fall-plowed land boosted yields by 10 bu. per acre.

Enough nitrogen and potash were present—either from fertilizer or the soil—to feed the corn crops in the tests, but lack of a sufficient number of stalks per acre held down yields in more than half the tests. Nitrogen or potash fertilizer also had to be added to get efficient use of phosphate in many of the fields.

It is profitable to plow under potash fertilizer in the fall, too, Iowa agronomist H. R. Meldrum reports. Corn yields were upped by 46 bu. per acre in two 1952 tests, he says, when 80 lb. potash (130 lb. 0-0-60) was fall plowed. Disking-in the potash in the spring boosted yields by 42 bu.

"Many farmers like this idea of adding fertilizer in the fall," said Dumenil, "because it spreads out their work load and takes off some of the pressure from the busy spring season. It has advantages to fertilizer manufacturers, also. It allows them to schedule their production over more months of the year, and smooths out some of the humps and valleys of demand."

★

Low cost production is often thought of as the farmer's first line of defense in times of unstable prices, and growing high qualfty pasture, hay and grass silage on the home farm is one of the best ways to lower costs, according to the University of Wisconsin. Renovated pastures produce more forage over a longer part of the year. In Wisconsin, there are 4 to 5 million acres of pastureland on which production could be increased from three to five times by renovation — liming, fertilizing, and then reseeding to alfalfa, brome grass, and ladino clover.

★

Farmers can save at least $3 per acre in preparing their land for corn by using once-over tillage that plows and fits a seed-bed in one operation, reports Dr. R. L. Cook, Michigan State College agronomist.

Dr. Cook explains that in the once-over operation, a light tillage unit is hitched behind a conventional moldboard plow. Such a unit can be a plow packer, a rotary hoe, easy driller or some other smoothing implement.

With conventional tillage farmers usually go over their fields after plowing twice with a tandem disk and twice with a spring tooth harrow. He says that a plow packer attached to a plow can take care of all the tillage necessary for producing top yields of corn. Once-over tillage not only saves time, money and machinery, he says, but it saves soil, too.

Dr. Cook reports that too much tillage and running heavy machinery over the field in seed-bed preparation packs down the soil. This can result in loss of organic matter. It can cause plugging of soil pores, poor aeration and inefficient use of plant nutrients, in fertilizer added to the soil. The result is low crop yields, Dr. Cook says.

★

A cabbage maggot (Hylemyis brassicae Bouche) causes extensive damage to all cole crops grown in Indiana, say the entomologists at Purdue University. Infestation may vary from less than 10% in home gardens to over 80% in the vegetable growing areas of Marion and Lake counties. This insect is most destructive in the cooler months of spring and fall and consequently the heaviest losses are to cabbage, cauliflower, kale and radishes planted in April and early May, and to turnips and radishes planted in July and August.

★

John Falloon, University of Missouri soils specialist, reports that farmers can more than double the forage production on poor upland pastures when lime and fertilizer are added. Another advantage, too, says Mr. Falloon, is that the protein content of the forage is increased two and one half times.

Forage yields on fertilized pastures averaged 5,960 lb. per acre compared with only 2,516 lb. on untreated soil in a 1954 demonstration in Boone County, Missouri, he said. This was an increase of one and one half tons per acre.

Mr. Falloon reports the protein yield was 540 lb. on fertilized pasture and 196½ lb. on the untreated field.

He points out that Missouri farmers are now using about 12 times more fertilizer to boost crop yields than in 1942. Mr. Falloon says farmers are getting more crop building power in every ton of fertilizer they buy. The nutrient content of mixed fertilizer in Missouri has increased from 21.1% in 1942 to 31.4% at present, he says.

★

W. R. Boggess, professor of forest research at the Dixon Springs Experiment Station of the University of Illinois, says tests at the Pope County Station show that soils of the area that are farmed or grazed with little or no treatment tend to stabilize in the strongly acid range.

One example is a 10-acre untreated field in an experiment designed to study the relation of soil fertility to plant and animal production. After being grazed for 15 years, this field showed a very acid reaction in the top six inches of soil. The pH factor was 4.7, while a pH of 7.0 is neutral.

Soils of this type need about four tons of lime per acre to correct the acidity, Mr. Boggess says.

The Farm Chemicals Library
Reader Service Department
CROPLIFE

SOILS AND FERTILIZERS—Fourth Edition

Firman E. Bear

Covers in detail: soil chemicals, important soil elements such as nitrogen, phosphorus, calcium; yield prospects of crop plants, moisture control, soil management; mechanical operations; soil conservation; organic matter maintenance. New facts, accurate figures. 66 illustrations, 420 pages $6.00

SOIL FERTILITY (1955)

C. E. Millar, Professor Emeritus of Soil Science, Michigan State College.

A fundamental treatment of the principles of fertility in the soil, with major emphasis on the plant itself. Relevant aspects of soil chemistry, soil physics, soil microbiology and plant physiology from viewpoint of their influence on plant growth. Each major plant food element and the more important micro-nutrients fully treated with respect to supply in the soil, sources and amounts of additions, losses from the soil, functions in plant growth and plant symptoms of deficiency. Covers all sections, with considerable space to saline soils and soils of southern latitudes $6.75

CHEMISTRY OF THE SOIL (1955) *Firman E. Bear*

Presents a comprehensive picture of the chemical aspects of soils in relation to their development, present constitution and the uses to which they are put. Covers: chemical composition, soil, colloids, organic matter relationships, oxidation-reduction phenomena, acid, alkaline and saline soils, plant nutrition, nutrient fixation, trace element chemistry, root and soil relationships. Scientists engaged in soil research will find useful data directly applicable to their investigations. Food chemists, manufacturers and those manufacturing liming materials, fertilizers, soil conditions, surfactants, wetting agents, insecticides, fungicides and other agricultural chemicals will gain new ideas for future product research and development. 384 pages $8.75

SOILS AND SOIL MANAGEMENT *A. F. Gustafson*

A complete study of soils; physical properties, soil organisms, organic matter, relation of water, control of water, tillage, erosion, acidity and its control by liming, management of alkali soils, nitrogen and its importance to the farmer, production, conservation and utilization of farm manures, production and utilization of green manure crops; fertilizer materials and their effects on soils; crop rotations; fertilization and long-term maintenance of productivity of mineral soils. Published 1941. 424 pages, illustrated $6.00

IRRIGATED SOILS: Their Fertility and Management—New 1954—Second Edition

D. W. Thorne and H. B. Peterson, Department of Agronomy, Utah State Agricultural College. Dr. Thorne is also Chief of Soils and Fertilizer Research Branch, Tennessee Valley Authority.

An outstanding text dealing with the problems of irrigated regions. In addition to the chapters dealing with irrigation, the salt problem, reclamation of saline and alkali soils, there are chapters on maintaining organic matter in soil, minerals and plant growth, fertilizer elements and fertilizer materials, using fertilizers, soil management for general field crops, for fruit, vegetable and specialty crops $6.50

THE RESPONSE OF CROPS AND SOILS TO FERTILIZERS AND MANURES (1954) *W. B. Andrews*

A new book, with special reference to Anhydrous Ammonia and other sources of nitrogen in liquid form. Deals also with legumes as a source of soil nitrogen, and the uncertainty of green manures; the response of soil to phosphorus, potash and soda; the effect of fertilizers on yield and feeding value of hay and pasture crops. 468 pages, 19 chapters, 89 illustrations $4.50

SOIL SCIENCE SIMPLIFIED *Helmut Kohnke*

A concise textbook dealing with basic concepts of soils. Much useful information for students in agriculture, farmers, fertilizer salesmen, etc. 68 pages, paper bound $1.00

MANUAL ON FERTILIZER MANUFACTURE—Second Edition *Vincent Sauchelli*

Available Oct. 1, 1954. A complete up-to-date revision of this well known book, that reviews in simple, everyday language the processes of manufacture of superphosphates, of ammoniation, and the formulation and preparation of mixed fertilizers. Indispensable to fertilizer plant supervisors and operators, and a valuable aid to research men and teachers. New chapters added: on plant nutrition, mixed fertilizers, ammoniation, granulation, revised and brought up-to-date. 80 tables of practical information $4.50

COMMERCIAL FERTILIZERS, Their Sources and Use—Fifth Edition (1955) *Gilbeart H. Collings*

Based upon the author's practical experience as an experiment station agronomist and teacher, and incorporating information on recent developments by agronomists, chemists, engineers and fertilizer manufacturers. Authoritative on problems concerning commercial fertilizers and their use in gaining larger yields. 160 illustrations, 522 pages $8.00

USING COMMERCIAL FERTILIZER (1952)

Malcolm H. McVickar

Dr. McVickar is chief agronomist of the National Fertilizer Association. The book deals specifically with commercial fertilizer, how it is produced and how to use it. It is non-technical. It includes chapters on how to measure fertility of soils, secondary and trade-element plant foods. 208 pages, 106 illustrations, cloth bound $3.00

HUNGER SIGNS IN CROPS—Second Edition

A symposium—published jointly by the American Society of Agronomy and the National Fertilizer Association.

A comprehensive study of nutrient-deficiency symptoms in crops compiled by 19 of the leading authorities in the field. It is being widely used by college professors, research and extension specialists, industrial chemists and agronomists, county agents, and teachers of vocational agriculture. Many farmers have found it of particular value in planning their fertilizer programs. Cloth bound, 290 pages, 242 illustrations, including 124 in full color $4.50

PLANT REGULATORS IN AGRICULTURE

Dr. Harold B. Tukey

Published September, 1954. A textbook giving background material for county agents, farmers, citrus growers, nurserymen, gardeners; providing fundamentals and general principles; covers encouragement of roots by plant regulators, control of flowering and fruit setting, parthenocarpy, abscission, prevention of preharvest fruit drop, delaying foliation and blossoming, maturing and ripening, inhibition of sprouting and weed control. Brings together specialized knowledge of seventeen authorities in the field, with two chapters written by Dr. Tukey, head of department of horticulture at Michigan State College. 269 pages $5.50

MIDWEST FARM HANDBOOK—New Third Edition

A publication of The Iowa State College Press

Twenty big sections cover all phases of farming, including livestock, the dairy herd, livestock disease prevention, dairy products, poultry and poultry diseases, agricultural engineering, soils and crops, weed control, plant disease control, pest control and other valuable helps to the farmer, feed and fertilizer dealer, etc. 387 pages, with many illustrations in color $3.00

THE PRODUCTION OF FIELD CROPS—New Fourth Edition *T. K. Wolfe and M. S. Kipps*

Revision of a college textbook for beginning courses in field crops and reference for those interested in the practical aspects of crop production. Gives fundamental information on grassland farming, economics of crop production and control of insect pests. This fourth edition treats each method of operation of the major crops individually. 495 pages, illustrated $6.50

FORAGE CROPS *Gilbert H. Ahlgren*

Considers all phases of forage crop production. Influence of climate and soil. Growing of alfalfa, clovers, soybeans, vetches, grasses and cereal hay crops. Identifying plants, knowing the seeds. Soil improvement practices, seedbed preparation. Hay standards, quality production, saving labor. Insects good and bad. Published 1949. 418 pages, 99 illustrations $6.00

NATURE AND PREVENTION OF PLANT DISEASES—Second Edition *K. Starr Chester*

Stresses the practical aspects of plant disease control, presents the essential features of plant pathology as exemplified in the leading diseases of important American crops. Gives adequate attention to field crops and to important sections not heretofore fully covered. 224 illustrations; 525 pages; glossary $5.00

THE CARE AND FEEDING OF GARDEN PLANTS

Published jointly by the American Society for Horticultural Science and the National Fertilizer Association.

An entirely new, one-of-a-kind book, it is designed to acquaint readers with nutritional deficiency symptoms or "hunger signs" of common yard and garden plants including lawn grasses, shrubs, flowers, garden vegetables, and cane and tree fruits. It stresses plant "feeding," or "what makes plants grow." Sixteen of the nation's leading horticultural authorities collaborated in its preparation. Cloth bound, 300 pages of text and illustrations including 37 pages in full color $3.00

SUPPLEMENTAL IRRIGATION FOR EASTERN UNITED STATES (1954) *Harry Rubey*

Techniques for water conservation in years of limited rainfall. Chapter headings: Methods of Applying Water to the Land; Surface Irrigation; Irrigation by Sprinkling; Water and Fertilizer Team Up for Better Yields; Costs and Profits; How to Go About Starting Irrigation. Cloth bound, 209 pages, 50 illustrations $3.50

WEEDS—Second Edition (1955) *W. C. Muenscher*

Entire book has been revised and reset, with descriptions of seventy weeds added to the original list of five hundred, plus twelve new full-page plates depicting nineteen kinds. Keys and full descriptions provided for identification with detailed illustrations of 331. Types and sources of weeds, their means of reproduction and dissemination, and the amount of damage they inflict on crops. Specific directions for control, with references to chemical methods of recent discovery $10.00

WEED CONTROL

W. W. Robbins, A. S. Crafts, and R. N. Raynor

A textbook-manual presenting a modern view of the rapidly developing field of chemical weed control. Reports in detail the research on which most modern herbicide usage is based. Weeds, their reproduction, prevention, biological control, chemicals in weed control. Herbicides, foliage contact applications, hormone-like substances, root applications, evaluations of combinations of chemical applications. Weeds of grasslands and turf. Special weed problems, cropped and uncropped areas. Published 1952. 503 pages, 155 illustrations $8.00

THE CHEMISTRY AND ACTION OF INSECTICIDES

Harold H. Shepard, Entomologist, U.S. Department of Agriculture, formerly Associate Professor of Insect Toxicology, Cornell University.

Treats the chemistry of insecticides, the history of their use, their commercial importance here and abroad, the nature of the major uses, the influence of environment on effectiveness. Materials are arranged according to their chemical relationships. Two chapters relating to organic compounds largely new as insecticides. Illustrative data in form of tables, and a convenient appendix of equivalents arranged for practical use in the field. 504 pages $7.00

APPLIED ENTOMOLOGY, Fifth Edition

H. T. Fernald and Harold H. Shepard.

This text since 1921 has had an outstanding record of usefulness. The Fifth Edition preserves the general organization and coverage, with changes to improve the presentation and to incorporate new knowledge. Contains chapters on anatomy, physiology and development. The economic importance and control of insects are discussed in a general way with much attention to insecticides. The classification of insects is emphasized, with examples drawn from species conspicuous for being very harmful or decidedly beneficial. Specific control measure included for injurious forms. Last chapter considers other pest animals closely related to insects. 385 pages $7.00

CHEMICAL BUSINESS HANDBOOK *Dr. John H. Perry*

1,300 double column pages, the equivalent of several average books; 700 illustrations, by 124 contributors. Market research data section is 280 pages, business mathematics 200 pages, financial and accounting 142 pages, research and development 150 pages, sales and advertising 92 pages, twenty sections in all. The book deals with chemical management problems and is useful to technical men, engineers and executives, in the chemical and allied fields. Dr. Perry is editor of the Chemical Engineers Handbook, a companion publication $17.00

No C. O. D.'s

Order From

Reader Service Department
CROPLIFE
P.O. Box 67
Minneapolis 1, Minnesota

Work Starts on New Geigy Home Office

GREENBURGH, N.Y.—Excavation work began here May 21 for construction of Geigy Chemical Corp.'s new home office.

The facilities are expected to be ready for occupancy about May, 1956, and will house the headquarters of Geigy's agricultural chemicals, industrial chemicals, pharmaceuticals and dyestuffs divisions, according to a company spokesman.

Four buildings are being constructed on a 35-acre site adjoining Saw Mill River Road here. The site is near White Plains and about 18 miles north of New York City in Westchester County.

Contractors are Vermilya-Brown Co., Inc., New York, and Skidmore Owings & Merrill, New York, is the architect.

NITROGEN

(Continued from page 1)

price concessions are now seen largely as seasonal.

They are provoked by the decline in farm income and buying power and the lateness of the planting season for crops in many areas such as the Midwest and Pacific Northwest.

Those conditions are asserted to be most likely the direct cause of price pressure on the steel industry, producers of nitrogenous solids. However, government officials say that the backing up of nitrogen fertilizer materials probably would spread into all types of nitrogen since expansion in this field has largely been in types other than solid.

The impending price concessions are seen primarily as a "flurry" or "summer squall"—which will probably be corrected through sales efforts to find storage space outside producing plants in the distributor and formulator fields and some at the farm level. Unfortunately, there are no solid statistics on which one may measure the storage capacity of these distribution or consumer units, although it is known that there has been a broad expansion in this area.

Price pressure rising from a supply-demand squeeze will probably hit the ammonia nitrogen producers the heaviest, since production expansion of anhydrous ammonia has probably exceeded expansion of storage facilities at all levels, USDA officials say, but they admit the problem is general to the entire industry.

By-product recovery of nitrogen from the steel and coke oven industry may have proceeded at a greater pace than had been contemplated, since these industries have been operating at close to capacity.

This factor now appears to be upsetting the statistical estimates of federal government officials, who in the past urged expansion of synthetic nitrogen production at a rate faster than industry officials deemed appropriate.

Frequently, however, virtue rises from adversity and this indicated price situation in nitrogen may be the occasion. Nitrogen has an established position in the agricultural field, a situation supported by some of the leading farm economists who forecast that anhydrous ammonia will be adopted for the nation's corn crop in a shorter period of time than was the hybrid seed corn development.

A temporary surplus condition in this commodity conceivably could cause those in the chain of distribution, and farmers, to create storage facilities which might be the safety valve for spotty periods of over-production.

INSECT, PLANT DISEASE NOTES

(Continued from page 5)

area of the state. Growers from Artesia and Dexter are reporting alfalfa 4 to 6 inches high in infested spots at first cutting time. Non-infested alfalfa in the same fields runs 20 to 24 inches high. Growers are reporting good controls with parathion, metacide, methyl parathion, and malathion.

Grasshoppers on the College Ranch are 60 to 70% adults, ranging from 25 to 150 per square yard. They are still feeding exclusively on Astragulus and on May 12 were beginning to move. They were heading southwest at 4 p.m. with an estimated 5 mph west wind blowing. Adults were seen at least 600 feet in the air, all heading southwest, the nymphs were also moving the same direction.

Stink bugs are building up on the range weeds. Adults and third and fourth instar nymphs are very numerous in northern Dona Ana County.

Lygus are reported as building up rapidly in alfalfa with some injury occurring. All stages of growth are present. Thrips are present in large numbers in alfalfa and are numerous in untreated fields.

The white-lined sphinx in the black phase is very abundant on range in northern Dona Ana County. The larvae are from half grown to nearly mature. No green phase larvae were found in this area. Chinch bugs are reported active on small grains in Eddy County. The grain is mostly in the late dough stage so no controls are planned.

Cowpea aphids have appeared in scattered locations on cotton. They have shown up in large numbers in the Mesilla Valley. Hornflies in northeastern New Mexico have reached populations of 500 or more per animal. Ranchers are putting on first sprays now.

Bollworms are laying eggs on cotton and alfalfa in the Mesilla Valley.

Livestock Pests at Work in S. Carolina

CLEMSON, S.C.—Armyworms are reported as seriously damaging small grain in Richland and Calhoun Counties. Oats were being attacked in Dillon County.

In vegetable plantings, diamondback moth was causing considerable injury to unprotected plantings of cabbage. Infestations are higher than any occurring during recent years. Light infestations were reported for imported cabbageworm, cabbage loopers, Mexican bean beetle, leaf miner, thrips and spider mite.

Livestock pests were also active. Ked, or sheep tick on sheep is causing injury to lambs after shearing. The adult of heel fly is causing cattle in the state to stampede.

Grasshoppers Threaten Crops in Kansas

MANHATTAN, KAN. — Severe grasshopper damage can be expected again this year in the eastern part of Kansas according to Dell Gates, Kansas State College extension entomologist.

Since spray materials are more efficient on young grasshoppers, it is being recommended that farmers start spraying within the next week or two in the eastern part of the state.

"Recent rains in southeast Kansas will speed the grasshopper hatch in that area, and early-hatched grasshoppers will have developed wings and migrated from fence rows to gardens and fields within the next two weeks," Mr. Gates pointed out.

Grasshoppers were not expected to be too much of a problem in central Kansas this year, but recent surveys have given counts as high as 15 per square yard.

Delaware's Armyworm Population Hatching

NEWARK, DEL. — Hatching of armyworms is well underway in Delaware. Farmers are being warned to watch out for them. Control measures suggested include toxaphene, methoxychlor and DDT.

Pea aphid is active on all legumes and has become serious in commercial pea plantings from Middletown to Houston and Milton. Cutworms have also caused considerable loss to newly-set tomato plants in a number of counties.—L. A. Stearns and J. W. Heuberger.

Tests Planned for New Insecticides

WASHINGTON — K. P. Ewing, U.S. Department of Agriculture entomologist, has expressed high hope that two new experimental insecticides from phosphorus compounds developed by a large chemical company will provide the basis for systemic control of cotton insects.

Comparative tests are contemplated by Mr. Ewing to reveal the ability of these systemic insecticides to control thrips, aphids and spider mites.

USDA Sees Evidence Of More Corn Borers

WASHINGTON — Corn growers this year, facing a heavier-than-normal infestation of European corn borer, have been urged by the USDA to make use of effective means of controlling this pest.

Last year, borers destroyed an estimated 191 million bushels of dent corn, according to USDA, and this year, entomologists are forecasting even greater damage by the insect.

Reasons for regarding 1955 as a heavy borer year include the fact that nearly three times the number of live borers are found in fields as compared to last year's count. Some 14,000 live borers an acre have been found in some areas and in northeast Nebraska, infestation is estimated at 22,000 borers an acre. High winter survival in South Dakota is said to be 77% in some localities.

Control measures recommended by USDA include DDT and Ryania, in either dust or spray forms. Timing is of great importance. When ¾ of plants show evidence of recent borer feeding in the whorl, or from 10 to 14 days after first borer eggs hatch is the optimum time.

OUTBREAK ON LONG ISLAND

NEW YORK—The heaviest outbreak of tent caterpillars in 10 years has been reported on Long Island.

FERTILIZER CONSUMPTION

(Continued from page 1)

nutrients was 26.61% in 1953-54 as compared with 25.05% for the preceding year.

The data presented herein were compiled from manufacturers' reports of shipments to agents, dealers, distributors and farmers in the territories (except Alaska), and the District of Columbia, and the states except California, Florida, Massachusetts, Missouri, North Carolina, South Carolina and Texas. For the latter seven states the data were compiled chiefly from the reports of the respective fertilizer control officials. No data were available for Alaska.

Supplementary information was furnished by the control offices and other state agencies, as well as by fertilizer brokers, and special inquiries were made of all known distributors and custom applicators of anhydrous ammonia.

The quantities are reported as 2,000-lb. tons. Although the data refer to shipments, the terms "consumption," "sales," and "shipments" are used synonymously. The actual consumption differs slightly, no doubt, from either the shipments or sales.

All Fertilizers

The consumption of the two classes of fertilizers, mixtures and materials, is summarized by states and regions in Table 1. The tonnage of all fertilizers consumed in each of 16 states, the District of Columbia, Hawaii and Puerto Rico was higher than in 1952-53.

Based on the tonnages for each six-month period of 1952-53, most of the decrease in total consumption of all fertilizers in 1953-54 occurred in the July-December period. Consumption for this period in 1953-54 was 781,930 tons (11.57% below that for the corresponding period of 1952-53, while for the January-June period consumption was 142,821 tons (0.86%) above the quantity for the same period of 1952-53.

During the fall period, there was a decrease of 317,338 tons of mixtures and 464,592 tons of materials, while in the spring period the consumption was higher by 136,190 tons of mixtures and 6,631 tons of materials.

Regional distribution of the consumption of all fertilizers in 1952-53 and 1953-54, as percentages of the country totals, is shown in Table 1a.

TABLE 1a—Regional Percentage Distribution of Consumption of All Fertilizers

Region	1952-53	1953-54
New England	2.01	1.83
Middle Atlantic	9.05	9.08
South Atlantic	26.79	26.97
E. No. Central	21.79	21.18
W. No. Central	8.95	9.77
E. So. Central	13.62	13.28
W. So. Central	5.99	6.12
Mountain	1.55	1.73
Pacific	8.64	8.23
Territories	1.61	1.81
U.S.	100.00	100.00

In Table 1, the percentage change in consumption of fertilizers in 1953-54 as compared with 1952-53 is based on the tonnage of primary nutrient fertilizers only, in order that a direct comparison may be made with the percentage change in consumption of the primary nutrients themselves.

Mixtures

Mixed fertilizers consumed in the U.S. and Territories amounted to 15,541,076 tons, as compared with 15,722,224 tons in 1952-53. The quantity of mixtures consumed in 1953-54 was 68.24% of the total fertilizer tonnage, as compared with an average of 67.46% for the preceding five-year period. In 1953-54, 1,319 grades were reported by their guaranteed analyses. It is estimated that additional grades approximating 500 in number were reported under unspecified designations.

Consumption of individual grades of mixtures in total quantities of 2,500 tons or more in the continental U.S. is shown in Table 2. In 1953-54, there were 176 of these grades totaling 14,853,606 tons and accounting for 97.35% of the total quantity of mixtures consumed. Other reported grades numbered 1,044 and totaled 280,907 tons, and approximately 500 grades reported under unspecified designations totaled 123,540 tons.

Consumption of mixed fertilizers in Hawaii and Puerto Rico totaled 283,023 tons in 141 grades (all specified). While most of the grades in Puerto Rico are similar to those used on the continent, many of those in Hawaii are designated in fractional numbers.

The tonnages of the 10 grades most favored in the continental U.S. are shown in Table 2a. The total tonnage of these grades accounted for 50% or more of the total tonnage of mixtures consumed in the continental U.S. in both 1952-53 and 1953-54.

Grades 3-12-12, 5-10-10, and 5-10-5 were the only ones of this group that retained the same relative position in both years. Grade 3-9-6 ranked fourth in 1952-53 but dropped to sixth place in 1953-54, being exceeded in tonnage by grades 10-10-10 and 4-16-16.

The tonnages of the 15 principal grades consumed in each of the continental regions and Puerto Rico in 1953-54 are shown in Table 3, together with the tonnages of these grades for each state in the region. The total tonnage of these 15 grades represents 55% or more of the consumption of mixtures in each of the regions.

Among the individual states, the total number of specified grades ranged from 16 for Nevada to 782 for Florida. For California, the

Table 1—Fertilizer Use, Year Ended June 30, 1954[1]

State & Region	Mixtures: July 1 - Dec. 31, 1953	Mixtures: Jan. 1 - June 30, 1954	Mixtures: Total	Materials 2/: July 1 - Dec. 31, 1953	Materials 2/: Jan. 1 - June 30, 1954	Materials 2/: Total	All Fertilizers 1953-54	Relative Consumption 1952-53 = 100: Fertilizers 3/	Relative Consumption 1952-53 = 100: Total N, Avail. P_2O_5 & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	17,703	147,047	164,750	2,516	4,516	7,032	171,782	81	81
New Hampshire	1,444	10,381	11,825	861	3,126	3,987	15,812	74	74
Vermont	3,130	24,434	27,564	5,899	4,978	10,877	38,441	77	85
Massachusetts	10,120	58,996	69,116	4,330	11,572	15,902	85,018	100	98
Rhode Island	1,839	11,616	13,455	633	1,378	2,011	15,466	100	100
Connecticut	6,395	58,808	65,203	3,525	21,508	25,033	90,236	104	106
New England	40,631	311,282	351,913	17,764	47,078	64,842	416,755	89	88
New York	94,453	418,689	513,142	39,738	56,565	96,303	609,445	92	96
New Jersey	50,635	215,403	266,038	8,351	16,619	24,970	291,008	106	106
Pennsylvania	156,080	452,097	608,177	24,890	47,880	72,770	680,947	97	100
Delaware	13,409	75,364	88,773	931	5,177	6,108	94,881	106	109
District of Columbia	565	1,342	1,907	458	333	791	2,698	104	106
Maryland	73,604	218,421	292,025	5,800	14,715	20,515	312,543	103	106
West Virginia	13,191	54,660	67,851	3,722	5,610	9,332	77,183	88	89
Middle Atlantic	401,937	1,435,976	1,837,913	83,890	146,902	230,792	2,068,705	98	100
Virginia	147,453	537,648	685,101	22,296	91,666	113,962	799,063	94	96
North Carolina	218,046	1,272,600	1,490,646	46,380	312,165	358,545	1,849,191	98	98
South Carolina	100,945	571,078	672,023	41,709	227,389	269,098	941,121	95	98
Georgia	158,151	944,555	1,102,706	50,260	216,068	266,328	1,369,034	98	104
Florida	415,334	656,196	1,071,530	48,115	67,036	115,151	1,186,681	103	104
South Atlantic	1,039,929	3,982,077	5,022,006	206,768	914,324	1,121,092	6,143,098	98	100
Ohio	308,914	709,228	1,018,142	24,150	51,876	76,026	1,094,168	93	99
Indiana	235,604	788,496	1,024,100	49,758	106,873	156,638	1,180,728	98	106
Illinois	189,980	461,540	651,520	411,552	463,075	874,627	1,506,147	91	105
Michigan	156,591	388,340	545,231	17,812	37,349	55,161	600,392	83	99
Wisconsin	70,210	331,931	402,141	10,496	28,566	39,062	441,203	108	112
East North Central	961,899	2,679,535	3,641,134	513,767	687,737	1,201,504	4,822,638	95	104
Minnesota	48,285	203,259	251,544	20,145	51,086	71,231	322,775	121	132
Iowa	86,053	334,811	420,864	50,873	180,421	231,294	652,158	118	136
Missouri	141,683	327,052	468,735	114,778	173,107	287,885	756,620	91	106
North Dakota	8,419	16,639	25,058	9,952	14,667	24,619	47,677	118	121
South Dakota	2,299	11,100	13,399	4,676	11,932	16,608	30,007	180	202
Nebraska	12,790	53,156	65,946	41,897	91,273	133,170	199,116	134	157
Kansas	53,723	45,847	99,570	63,640	52,679	116,319	215,889	90	98
West North Central	351,252	991,864	1,343,116	335,961	545,165	881,126	2,224,242	106	123
Kentucky	55,979	396,794	452,773	35,289	93,521	128,810	581,583	95	100
Tennessee	70,135	324,998	395,132	40,502	88,460	128,962	524,094	90	92
Alabama	91,684	745,949	837,633	113,722	232,239	345,961	1,183,494	94	95
Mississippi	19,889	334,519	354,408	140,371	239,949	380,320	734,728	100	107
East South Central	235,685	1,804,261	2,039,946	329,884	654,169	984,053	3,023,999	95	100
Arkansas	18,966	174,831	193,797	35,592	141,288	176,880	370,677	101	109
Louisiana	28,581	144,781	173,362	44,324	100,480	144,804	318,166	100	106
Oklahoma	24,323	40,191	64,514	50,148	30,328	80,476	144,990	99	109
Texas	60,663	220,724	281,387	125,808	153,800	279,608	560,995	99	102
West South Central	132,533	580,527	713,060	255,872	425,896	681,768	1,394,828	100	106
Montana	1,103	3,131	4,234	11,894	12,974	24,868	29,102	112	120
Idaho	72	6,714	6,786	30,756	52,452	83,208	89,994	122	141
Wyoming	55	2,324	2,379	2,965	5,888	8,853	11,232	88	99
Colorado	3,224	11,466	14,690	10,146	22,938	33,084	47,774	97	110
New Mexico	172	1,975	2,147	5,570	14,645	20,215	22,362	81	82
Arizona	5,519	15,943	21,462	38,843	94,896	133,739	155,201	112	109
Utah	270	3,351	3,621	9,427	15,369	24,796	28,417	89	102
Nevada	201	672	873	2,737	5,545	8,282	9,155	94	93
Mountain	10,616	45,576	56,192	112,338	224,707	337,045	393,237	106	112
Washington	5,777	23,853	29,630	58,469	113,172	171,641	201,271	131	154
Oregon	4,519	17,460	21,979	45,347	80,074	125,421	147,400	99	107
California	85,168	138,096	221,264	581,660	723,042	1,304,702	1,525,966	106	103
Pacific	95,464	179,409	272,873	685,476	916,288	1,601,764	1,874,637	109	108
Continental U. S.	3,247,546	12,010,507	15,258,053	2,541,720	4,562,266	7,103,986	22,362,039	98	104
Hawaii	30,237	28,927	59,164	36,245	44,639	80,884	140,048	103	106
Puerto Rico	92,239	131,620	223,859	25,434	22,119	47,553	271,412	110	108
Alaska 4/	—	—	—	—	—	—	—	—	—
Territories	122,476	160,547	283,023	61,679	66,758	128,437	411,460	109	107
Total: 1953-54	3,370,022	12,171,054	15,541,076	2,603,399	4,629,024	7,232,423	22,773,499	98	104
1952-53	3,687,360	12,034,864	15,722,224	3,067,991	4,622,393	7,690,384	23,412,608	100	100
1951-52	3,533,404	11,552,945	15,086,349	2,886,958	4,459,111	7,346,069	22,432,418	96	92

1/ Includes: Ground phosphate rock, basic slag, secondary and trace element materials, such as, borax, sulfur, manganese sulfate, etc., used as separate materials, also fertilizers distributed by Government agencies. Does not include liming materials, but includes gypsum.
2/ Excludes the quantities of materials used for manufacture of commercial mixtures.
3/ Fertilizers which were guaranteed to contain primary plant nutrients (N, P_2O_5, K_2O).
4/ Not available: Consumption of all fertilizers in 1952-53 amounted to 653 tons.

Table 2—Mixed Fertilizer Use by Grades

Grade	Consumption 1952-53 1/	Consumption 1953-54	Proportion of Total 1952-53	Proportion of Total 1953-54
	Tons	Tons	Percent	Percent
0-8-24	4,026	5,468	0.03	0.04
0-9-27	26,497	15,510	.17	.10
0-10-10	3,194	4,367	.02	.03
0-10-20	62,993	49,130	.41	.32
0-10-30	35,324	45,006	.23	.30
0-10-45	2,795	3,769	.02	.02
0-12-12	123,881	66,343	.80	.43
0-12-16	3,260	2,765	.02	.02
0-12-20	26,478	20,121	.17	.13
0-12-24	2,017	2,976	.01	.02
0-12-36	6,076	8,554	.04	.06
0-14-5	3,882	4,611	.03	.03
0-14-7	76,332	32,590	.49	.21
0-14-10	25,788	8,200	.17	.05
0-14-14	266,366	177,499	1.72	1.16
0-15-15	31,888	11,632	.21	.08
0-15-30	12,876	17,998	.08	.12
0-16-8	9,206	12,881	.06	.08
0-20-10	28,770	22,908	.19	.15
0-20-20	306,128	343,162	1.97	2.25
0-30-15	3,826	6,528	.02	.04
0-30-30	6,532	11,063	.04	.07
2-10-6	7,797	8,044	.05	.05
2-12-6	156,447	81,034	1.01	.53
2-12-12	409,203	404,036	2.65	2.65
3-6-5	6,442	4,302	.04	.03
3-8-8	16,866	12,743	.11	.08
3-9-6	671,216	608,256	4.34	3.99
3-9-9	455,699	489,239	2.95	3.21
3-9-12	38,079	28,981	.25	.19
3-9-15	7,081	9,306	.05	.06
3-9-18	154,685	113,702	1.00	.75
3-9-27	118,009	123,964	.76	.81
3-10-6	5,098	2,693	.03	.02
3-10-12	7,787	6,209	.05	.04
3-12-6	478,876	278,396	3.10	1.82
3-12-8	1,262	3,990	.01	.03
3-12-12	2,241,137	1,730,944	14.50	11.34
3-18-9	114,616	72,765	.74	.48
4-6-5	6,126	6,201	.04	.04
4-6-6	17,290	15,583	.11	.10
4-6-8	51,267	48,399	.33	.32
4-7-5	130,603	130,530	.85	.86
4-8-4	12,736	13,967	.09	.09
4-8-6	481,176	320,689	3.11	2.10
4-8-8	330,422	393,334	2.14	2.58
4-8-10	63,486	87,500	.41	.57
4-8-12	78,761	51,841	.51	.34
4-9-3	77,400	76,442	.50	.50
4-10-6	581,802	498,719	3.76	3.27
4-10-7	527,094	552,416	3.41	3.62
4-10-8	5,810	6,334	.04	.04
4-10-10	9,636	9,513	.06	.06
4-12-4	192,110	142,517	1.24	.93
4-12-6	7,346	2,883	.05	.02
4-12-8	160,946	152,806	1.04	1.00
4-12-12	204,880	370,014	1.32	2.43
4-12-16	3,110	2,651	.02	.02
4-12-24	1,736	3,110	.01	.02
4-16-0	25,882	11,996	.17	.08
4-16-8	71,296	52,456	.46	.34
4-16-16	473,321	698,177	3.06	4.58
4-24-12	81,271	86,070	.53	.56
5-3-6	2,805	3,640	.02	.02
5-5-5	1,894	2,564	.01	.02
5-5-8	7,661	8,208	.05	.05
5-5-10	1,246	2,536	.01	.02
5-6-6	1,487	2,708	.01	.02
5-6-8	7,702	7,363	.05	.05
5-7-5	25,977	24,068	.17	.16
5-7-10	5,141	3,725	.03	.02
5-8-7	19,922	16,840	.13	.11
5-8-8	4,632	4,630	.03	.03
5-10-5	877,240	821,116	5.68	5.38
5-10-10	1,115,741	1,287,746	7.22	8.44
5-10-15	33,221	90,404	.22	.59
5-10-16	16,316	6,835	.11	.04
5-10-20	3,789	7,819	.02	.05
5-15-10	22,851	10,040	.15	.07
5-15-15	4,084	17,319	.03	.11
5-15-30	4,083	4,747	.03	.03
5-20-10	17,117	44,710	.11	.29
5-20-20	87,676	300,606	.57	1.97
6-3-6	22,467	26,182	.15	.17
6-4-6	8,063	11,047	.05	.07
6-4-8	14,588	21,204	.09	.14
6-6-6	79,328	81,097	.52	.53
6-6-8	16,968	14,169	.07	.09
6-6-12	5,283	11,689	.03	.08
6-6-18	9,729	11,874	.06	.08
6-7-7	8,224	5,672	.05	.04
6-8-2	2,276	3,929	.01	.03
6-8-4	215,173	168,862	1.39	1.11
6-8-6	239,370	195,320	1.55	1.28
6-8-8	274,168	288,134	1.77	1.89
6-8-12	42,704	40,244	.28	.26
6-8-16	2,682	2,766	.02	.02
6-9-3	6,666	5,634	.04	.04
6-9-6	13,839	11,053	.09	.07
6-9-9	8,177	8,271	.05	.05
6-9-12	70,860	54,909	.46	.36
6-9-27	2,308	3,035	.02	.02
6-10-4	59,792	57,216	.39	.37
6-12-4	3,643	3,383	.02	.02
6-12-6	53,809	51,806	.35	.34
6-12-12	166,226	185,274	1.08	1.21
6-12-18	3,976	4,223	.03	.03
6-20-20	2,348	4,533	.02	.03
6-24-0	30,626	21,536	.20	.14
6-24-12	22,606	43,067	.15	.28
6-24-24	6,316	13,336	.04	.09
7-0-11	0	5,037	.00	.03
7-6-7	2,578	2,690	.02	.02
7-5-9	0	3,418	.00	.02
7-7-7	38,202	36,428	.25	.24
7-7-10	61	4,199	(2/)	.03
7-8-8	1,166	3,183	.01	.02
7-9-9	3,911	2,646	.03	.02
8-0-8	13,061	16,364	.08	.11
8-0-12	10,127	6,625	.07	.04
8-0-24	18,541	20,088	.12	.13
8-4-4	2,978	2,666	.02	.02
8-4-8	11,439	37,279	.07	.24
8-6-4	4,138	5,443	.03	.04
8-6-6	4,951	3,339	.03	.02
8-6-8	7,722	7,845	.05	.05
8-8-4	21,060	20,037	.14	.13
8-8-8	342,242	254,471	2.21	1.67
8-8-10	4,697	5,876	.03	.04
8-10-12	13,851	11,742	.09	.08
8-12-12	15,747	27,835	.10	.18
8-12-16	34,869	17,081	.23	.11
8-16-8	7,693	7,062	.05	.05
8-16-16	67,434	94,752	.44	.62
8-24-8	106,141	101,509	.69	.66
8-24-12	789	6,583	(2/)	.04
8-32-0	55,376	72,176	.36	.47
9-6-6	5,632	6,921	.04	.05
9-9-18	2,306	3,805	.01	.02
9-18-9	4,066	4,760	.03	.03
9-36-0	1,236	2,522	.01	.02
10-0-10	34,396	44,797	.22	.29
10-0-12	1,852	2,559	.01	.02
10-4-10	3,613	5,687	.02	.04
10-5-5	3,161	2,869	.02	.02
10-6-4	38,474	38,258	.25	.25
10-10-0	18,387	8,007	.12	.05
10-10-5	37,659	30,971	.24	.20
10-10-10	401,079	701,365	2.60	4.60
10-12-10	4,418	3,840	.03	.03
10-15-15	5,867	2,898	.04	.02
10-18-8	10,449	9,948	.07	.07
10-20-0	121,300	117,049	.79	.77
10-20-10	23,255	48,714	.15	.32
10-20-20	2,900	9,088	.02	.06
10-30-10	6,301	3,624	.04	.02
12-0-10	12,804	14,146	.08	.09
12-0-12	10,207	5,140	.07	.03
12-6-6	4,449	3,885	.03	.02
12-8-8	2,880	3,837	.02	.03
12-12-6	3,299	3,788	.02	.02
12-12-12	73,072	200,982	.47	1.32
12-24-0	8,880	11,743	.06	.08
12-24-12	36,891	31,384	.24	.21
13-13-13	15,786	24,136	.10	.16
14-0-14	30,809	38,892	.20	.25
14-14-0	5,008	8,286	.03	.05
14-14-14	0	2,862	.00	.02
15-0-12	3,078	4,437	.02	.03
15-8-6	14,485	8,451	.09	.06
15-15-0	32,404	58,402	.21	.38
16-0-8	2,764	2,874	.02	.02
16-10-0	0	6,888	.00	.04
17-7-0	32,807	19,705	.21	.13
19-19-0	0	3,550	.00	.02
20-0-20	1,139	4,447	.01	.03
176 Grades	15,008,790	14,853,606	97.12	97.35
Other specified grades 3/	318,489	280,907	2.06	1.84
Grades not shown 4/	128,663	123,540	.83	.81
Total 5/	15,453,952	15,258,053	100.00	100.00

1/ The tonnages of 48 grades were increased by amounts originally reported as "other specified grades." Their combined amount of increase was 12,194 tons. 2/ Less than 0.01 percent. 3/ There were approximately 1,149 in 1952-53 and 1,044 in 1953-54. 4/ There were, at least, 500 grades not shown by their guaranteed analysis. 5/ Does not include the quantity of mixtures consumed in the Territories.

Table 2a—Principal Mixed Fertilizer Grades

Grade	Consumption 1952-53	Consumption 1953-54	Proportion of Total Consumption of Mixed Fertilizers in Continental U.S. 1952-53	Proportion 1953-54
	Tons	Tons	Percent	Percent
3-12-12	2,241,137	1,730,944	14.50	11.34
5-10-10	1,115,741	1,287,746	7.22	8.44
5-10-5	877,240	821,116	5.68	5.38
10-10-10	401,079	701,365	2.60	4.60
4-16-16	473,321	698,177	3.06	4.58
3-9-6	671,216	608,256	4.34	3.99
4-10-7	527,094	552,416	3.41	3.62
4-10-6	581,802	498,719	3.76	3.27
3-9-9	455,699	489,239	2.95	3.21
2-12-12	409,203	404,036	2.65	2.65
Total	7,753,532	7,792,014	50.17	51.08

umber originally reported was 99, but **subsequent information** rom the **state fertilizer control** ffice indicates **over 800; some 200** rades were **originally included in** he unspecified group.

The consumption of mixtures by asses (N-P-K, N-P, P-K, N-K) for ch region and the U.S. is shown in ble 5. Except for the Mountain reon, N-P-K mixtures were favored er all other classes. More than 73% the tonnage of all mixtures conmed in each of the other regions as of this class. N-P mixtures were nsumed in largest tonnage in the ountain region.

For the U.S., 90.40% of the tonnage all mixtures was of the N-P-K ass, while for the other classes—P, P-K, N-K—consumption was 46%, 5.76%, and 1.38% of the total nnage, respectively.

These proportions have not changed eatly from year to year. Over the st several years, however, the proortions of the N-P and N-K classes ave steadily increased; in 1949-50, ey were 1.45 and 0.60%, respecvely.

The national weighted average primary nutrient content of mixed fertilizers increased from 25.84% in 1952-53 to 26.87% in 1953-54 (Table 7).

The average, for 1953-54, comprised itrogen, 5.01; available P_2O_5 11.59; nd K_2O, 10.27%. The average perentages of these nutrients in 1952-53 ere 4.63, 11.34, and 9.87, respecvely.

As compared with 1952-53, the inease in the average was 8.21% for itrogen, 2.20% for available P_2O_5, nd 4.05% for K_2O.

The average primary nutrient connt of all mixtures consumed in each ate and territory is shown in Table These averages for the 51 political nits covered showed for nitrogen creases in 44 and decreases in 7; r available P_2O_5, increases in 34 and ecreases in 17; for K_2O, increases in 5 and decreases in 16; and for total rimary nutrients, increases in 42 and ecreases in 9.

Materials

The consumption of fertilizer mateals for direct application amounted 7,232,423 tons in 1953-54 as comared with 7,690,384 tons in 1952-53. he quantity, in 1953-54, comprised emical nitrogen materials 3,260,403 ns, phosphate materials (including mmonium phosphates) 2,544,886 ns, natural organics 420,068 tons, tash materials (including nitrate of tash, nitrate of soda-potash, and me-potash) 391,553 tons, and seconry and trace element materials 5,513 tons.

Compared with 1952-53 there was increase of 273,104 tons in chemil nitrogen materials, 61,031 tons in tural organics and 34,627 tons in tash materials. Decreases of 564,-9 tons and 261,974 tons were own in phosphate materials and condary and trace element marials, respectively. The consumpn of the principal materials comising these classes is shown by ates and regions in Tables 4 and 5.

In chemical nitrogen materials he principal changes from the preious year were increases in anhyrous ammonia (from 217,182 to 50,474 tons), nitrogen solutions inluding aqua ammonia (from 72,-17 to 191,592 tons), and amonium nitrate (from 846,252 to 24,716 tons). Among the natural rganics, the consumption of dried anures increased from 207,127 to 59,868 tons.

Of the phosphate materials, the nsumption of ammonium phosphate 1-48 and 16-20 grades) increased m 226,222 to 275,931 tons, while creases were shown for basic slag 01,537 to 195,270 tons), phosphate k (1,176,962 to 912,676 tons) and perphosphates grading 22% and der (1,046,827 to 786,927 tons).

The total quantity of phosphate rock used in Illinois and Missouri, the two largest consuming states, was 722,520 tons in 1953-54, compared with 954,491 tons in 1952-53. The consumption of superphosphates grading 22% and under was below that in 1952-53 in 42 of the 51 states and other political units; total consumption of these grades amounted to only 42.38% of that in 1949-50.

The 60% grade of potassium chloride was greatly favored over the 50% grade; the respective consumptions of these grades were 256,979 and 53,056 tons, as compared with 172,210 and 110,255 tons in 1952-53.

The total consumption of gypsum decreased from 837,422 tons in 1952-53 to 576,780 tons in 1953-54. The consumption in California alone decreased from 719,788 to 414,067 tons.

The weighted average primary nutrient content of the principal classes of materials consumed is given in Table 7. These averages are based on the composition and tonnage of the individual materials comprising the several classes.

For materials containing only nitrogen, P_2O_5 or K_2O, the respective national averages were 30.81, 15.70 (available P_2O_5), and 54.01%, while the multiple-nutrient materials averaged 17.53%. The corresponding averages for these classes in 1952-53 were 28.54, 14.48, 51.89, and 21.96%.

With the exception of the multiple-nutrient materials, the national averages were higher than in 1952-53. This reflects the greater use of higher analysis products. The drop in the average concentration of multiple-nutrient materials was largely the result of the increase in consumption of dried manures,

Table 5—Kinds of Fertilizers Used in U.S.[1]

Kinds	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories 2/	Total
MIXTURES: N-P-K	326,667	1,738,122	4,631,803	3,315,152	980,949	1,896,339	645,266	21,244	228,980	261,098	14,049,649
N-P	94	92	1,989	2,442	271,241	72	29,082	34,048	39,786	3,317	382,962
P-K	25,232	104,656	194,184	202,825	60,624	143,938	38,906	79	2,162	2,308	694,814
N-K	0	44	193,930	716	108	481	177	21	1,946	16,215	213,631
CHEMICAL NITROGEN MATERIALS											
Ammonia, anhydrous	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	(3/)	380,474
Ammonium nitrate	4,390	26,836	81,042	116,200	176,901	233,353	112,764	46,147	197,194	0	924,716
Ammonium nitrate-limestone mixtures	170	3,324	291,066	17,464	14,740	60,222	3,485	82	80	0	390,603
Ammonium sulfate	265	3,762	6,334	55,558	25,063	9,662	66,232	56,830	341,334	69,993	636,736
Calcium cyanamide	738	7,600	16,029	5,563	342	16,092	15,061	1,280	6,636	0	68,213
Calcium nitrate	0	0	12,361	37	40	219	0	4,647	33,297	103	80,694
Nitrogen solutions 4/	0	2,116	5,003	13,132	34,193	896	4,290	14,189	95,976	21,016	6/ 191,592
Sodium nitrate	2,622	16,115	361,846	2,175	259	179,619	69,218	982	447	122	644,105
Other 5/	329	4,132	16,003	80,909	103,880	87,233	76,997	28,708	90,214	9,374	7/ 94,270
NATURAL ORGANIC MATERIALS											
Blood, dried	0	146	80	0	0	0	0	16	1,886	0	1,778
Castor pomace	5,089	70	2,998	0	0	0	0	66	1,484	0	8,686
Compost	86	4,289	1,131	235	4,186	0	1,982	0	3	0	11,602
Cottonseed meal 8/	7,880	61	1,362	2	0	0	2	0	7	1	9,306
Fish scrap, meal, and emulsions	431	2	0	0	0	0	0	1	1,080	0	1,494
Manures, dried	4,116	10,271	3,097	10,806	3,714	1,556	3,126	2,326	220,877	9	259,868
Sewage sludge, activated	4,615	9,956	5,001	26,090	6,831	1,164	2,289	2,191	14,346	70	70,021
" " , other	0	0	0	1,236	891	0	0	0	29,027	0	30,845
Tankage, animal	0	161	10	0	0	0	0	0	311	0	482
" , garbage	0	12	9	0	0	0	0	0	0	0	21
" , process	2,396	6,617	2,089	2,701	0	0	0	0	482	0	14,808
Other 9/	864	2	320	0	0	0	0	78	6,896	0	10,177
PHOSPHATE MATERIALS											
Ammonium phosphate: 11-48	0	1	286	0	10,966	0	71	8,076	14,000	2,797	33,066
" " 16-20 10/	0	15	69	1,098	66,895	87	80,647	34,172	67,527	2,355	242,865
" " 13-39	0	0	0	280	21,023	0	4,151	2,168	4,878	0	32,671
Ammoniated superphosphate 11/	0	0	72	0	0	0	0	989	6,661	741	8,388
Basic lime phosphate	0	0	966	0	0	2,768	0	0	0	0	3,736
Basic slag	0	2,000	38,491	0	0	151,268	8,011	0	0	0	195,270
Bonemeal, raw	246	380	271	97	61	28	110	7	972	0	2,182
" , steamed	1,804	3,677	1,134	1,362	1	418	844	1	1,016	0	9,667
Calcium metaphosphate	0	90	1,861	5,628	14,869	5,386	246	140	101	0	28,809
Fused tricalcium phosphate	0	0	1,455	1,822	33	20,718	304	0	0	0	24,242
Phosphoric acid: 52-54%	0	0	0	0	0	0	38	8,661	9,647	894	16,246
Phosphate rock	613	11,127	20,386	606,379	190,622	7,940	35,700	300	2,414	0	876,375
Colloidal phosphate	0	1,200	911	10,786	9,627	11,015	2,462	40	320	0	36,301
Precipitated bone	470	0	0	0	0	0	0	0	0	0	470
Superphosphate: 18%	4,729	15,974	40,967	34,102	17,882	33,472	206	3,307	30,076	0	180,637
" 19%	3,938	10	1,146	21	262	1,006	0	18,735	40,298	0	66,417
" 20-22%	15,727	90,650	30,137	77,390	63,296	109,866	138,776	6,844	1,943	8,876	640,853
" 23-41%	0	211	0	382	2,572	26	2,761	920	58	0	6,947
" 42-44%	0	0	0	0	25,853	0	0	35,890	10,168	0	71,320
" 45%	0	206	70	16,521	35,403	1,327	23,316	8,800	3,687	1	80,238
" 46%	0	29	280	1,774	13,798	1,224	412	16,951	6,456	80	41,002
" 47%	39	65	99	612	14,567	8,632	486	2,532	585	0	27,816
" 48%	0	0	361	1,765	1,840	1,143	786	77	1,390	0	7,262
" 49-50%	0	24	0	694	451	161	2,232	95	0	0	3,747
Other 12/	0	0	1,169	0	180	0	801	31	2	322	2,184
POTASH MATERIALS											
Cotton hull ashes	869	8	52	0	0	0	0	0	0	0	949
Lime-potash mixtures: 5-10% 13/	0	1,943	21,040	0	0	2,700	0	0	0	0	25,683
Manure salts: 20-30%	0	8	1,716	173	600	4	848	0	0	0	3,348
Potassium carbonate	0	0	164	0	0	0	0	0	0	0	164
Potassium chloride: 50%	34	167	21,206	6,667	1,798	11,369	10,061	21	993	900	53,056
" " 60%	1,909	3,629	23,127	113,968	26,329	41,365	30,610	311	4,174	11,538	256,979
" magnesium sulfate	146	263	3,299	1,971	848	682	491	0	8	3	7,061
" nitrate	166	7	0	0	0	0	0	0	0	0	196
" phosphate ash 11/	0	0	0	0	0	12	0	0	0	0	12
" sodium nitrate 11/	19	0	11,045	0	0	596	40	180	0	0	11,880
" sulfate	69	563	7,008	911	2	10,489	22	848	4,489	1,632	25,740
Tobacco stems	0	16	527	0	0	1	0	0	0	0	543
Wood ashes	0	0	5,456	0	0	0	0	0	0	0	5,456
TOTAL PRIMARY NUTRIENT FERTILIZERS	416,209	2,064,522	6,074,730	4,819,781	2,222,996	3,082,327	1,391,585	357,725	1,376,742	411,370	22,157,986
SECONDARY & TRACE ELEMENT MATERIALS 5/											
Aluminum sulfate	4	13	0	1	0	3	0	0	88	0	109
Borax	62	267	618	339	6	536	5	0	844	0	2,696
Calcium sulfate (gypsum)	406	3,241	66,186	1,665	1,241	367	1,200	29,204	473,471	0	576,780
Copper sulfate	0	56	170	166	0	2	0	2	184	0	880
Ferrous sulfate	0	0	18	2	0	0	0	84	519	0	602
Magnesium carbonate	0	0	0	0	0	0	0	6	6,122	0	6,122
" sulfate	18	189	1,061	23	0	0	0	0	119	14	1,379
Manganese sulfate	26	136	126	428	0	4	0	0	63	0	805
Mixed Minerals	0	144	11	3	0	6	21	79	2,717	0	2,881
Sulfur: 25-99+%	10	140	122	26	0	1	2,017	5,414	10,489	0	18,221
Sulfuric acid: 40-93%	0	0	0	0	0	0	0	761	2,298	0	3,039
Zinc sulfate	0	20	80	2	0	51	0	2	1,992	76	2,231
TOTAL SECONDARY & TRACE ELEM. MAT.	546	4,183	68,368	2,657	1,247	1,672	3,243	35,612	497,895	90	615,513
TOTAL ALL FERTILIZERS	416,755	2,068,705	6,143,098	4,822,438	2,224,243	3,083,999	1,394,828	393,337	1,874,637	411,460	22,773,499

1/ Includes distribution by Government agencies. Does not include the quantities of materials used for manufacture of commercial mixtures.
2/ Excludes Alaska as data was not available. 3/ Included with "Other Chemical Nitrogen Materials." Regional data cannot be published without disclosing operations of individual suppliers. 4/ Includes aqua ammonia. 5/ Contains 26.88 percent nitrogen. 6/ Anhydrous ammonia, ammonium sulfate-nitrate, urea, and chemical nitrogen materials not classified. 7/ Does not include above total for anhydrous ammonia.
8/ Excludes materials distributed by other than manufacturers of fertilizers. 9/ Meals: Crab (2), Hoof and Horn (476), Linseed (583), Lupine (86) Seed (313), Soybean (219), Tung (166), Vegetable (98); Peat (23)8/; and organics not classified 8,242 tons. 10/ Includes quantities reported as 16-20-0 mixture. 11/ Additional quantities may have been reported as mixed grades. 12/ Not classified. 13/ Includes cement flue dust. Additional quantities are given free to farmers for which no records are kept.

Table 3—State, Regional Consumption by Grades[1]

State	Fifteen Principal Grades Consumed in Regions — Tons															All Other Grades: Number 2/	All Other Grades: Tons	Total Tons
New England	5-10-10	6-9-12	8-12-12	6-3-6	8-16-16	8-12-16	5-8-7	7-7-7	10-10-10	0-15-30	5-10-5	6-9-9	8-9-10	0-14-14	6-8-8			
Maine	21,046	53,990	24,816	—	6,263	16,826	3,517	2,353	2,921	55	367	8,260	5,676	3,302	—	45	14,558	164,750
New Hampshire	3,838	—	253	—	1,681	14	914	699	915	861	141	—	—	165	—	24	1,986	11,835
Vermont	6,973	—	61	—	5,007	36	280	800	1,970	8,212	350	—	—	323	6	39	3,477	27,664
Massachusetts	17,015	—	—	8,716	4,002	77	6,906	5,990	4,089	421	5,304	—	—	790	1,206	27	14,497	69,116
Rhode Island	6,873	—	575	—	193	4	985	839	279	87	754	—	—	109	163	31	2,984	13,466
Connecticut	10,644	—	1,080	16,704	2,179	64	4,184	3,189	2,452	1,829	3,886	—	—	925	4,050	81	14,038	65,203
Total	66,089	53,990	26,787	25,422	19,885	17,019	16,816	14,869	12,643	11,444	10,802	8,260	5,676	5,634	5,427	106	51,450	351,913
Middle Atlantic	5-10-10	3-12-6	5-10-5	10-10-10	0-20-20	6-12-6	8-16-16	0-14-14	4-8-12	2-12-12	4-12-12	8-8-8	6-12-12	7-7-7	4-12-8			
New York	160,164	20,067	139,082	53,664	13,276	39,940	14,801	3,061	—	80	15	4,938	13,916	9,935	268	66	39,986	513,148
New Jersey	161,211	3,149	30,007	7,172	3,268	511	1,068	4,308	481	106	43	13,687	1,735	8,452	5,290	56	35,562	266,036
Pennsylvania	241,806	130,397	31,606	42,678	25,276	2,094	16,311	11,809	9,890	7,871	23,210	2,486	5,242	564	6,569	102	82,161	606,177
Delaware	44,065	3,732	2,463	4,894	1,832	—	4,237	3,489	5,117	4,262	1,283	434	1,368	287	873	61	12,407	86,773
District of Columbia	42	76	802	4	—	—	—	—	206	12	—	—	2	14	7	16	744	1,907
Maryland	82,056	65,717	28,225	12,016	3,991	—	2,343	9,631	19,194	16,070	5,874	3,084	1,061	1,966	4,029	68	38,120	292,025
West Virginia	21,766	16,937	4,348	2,688	4,087	—	237	2,816	—	1,710	99	10	833	2	4,488	38	8,216	67,861
Total	701,110	240,075	236,533	123,223	51,730	42,445	37,997	35,016	32,886	30,131	28,524	24,686	24,047	21,190	20,514	180	187,324	1,837,915
South Atlantic	4-10-6	3-9-6	3-9-9	2-12-12	4-8-8	4-8-6	4-12-12	5-10-10	5-10-5	4-7-5	6-8-6	4-8-10	3-12-12	6-6-6	4-8-5			
Virginia	66	67,611	34,914	191,830	—	—	25	105,128	76,003	—	14,673	4,777	10	—	4,906	45	187,269	686,101
North Carolina	323,195	380,440	158,704	142,960	295	—	10	146,818	46,542	—	63,288	72,015	32	—	80,626	41	133,723	1,490,048
South Carolina	174,383	60,192	202,167	—	36,487	—	12,101	12,918	60,260	—	5,872	—	81,711	—	—	28	35,932	672,023
Georgia	433	9,373	86,258	30,992	230,458	278,598	289,638	10,660	6,245	1	30,306	—	2,798	42	5,886	115	109,079	1,102,706
Florida	617	36	5,600	2,525	90,666	41,932	7,183	4,694	6,387	130,529	6,199	10,669	2,297	80,387	12,077	767	669,443	1,071,580
Total	498,696	487,651	487,643	368,307	357,896	320,530	308,957	280,208	195,437	130,530	129,337	87,459	86,848	80,429	76,442	931	1,135,436	5,022,006
East North Central	3-12-12	4-16-16	10-10-10	0-20-20	5-20-20	5-10-10	3-9-27	12-12-12	3-18-9	3-9-18	0-10-30	6-12-12	2-12-6	10-6-4	8-8-8			
Ohio	533,443	44,623	76,011	42,262	47,260	137,718	156	14,110	18,467	9,292	781	9,115	15,471	7,891	1,096	66	60,441	1,018,148
Indiana	362,033	265,936	140,086	59,212	45,438	13,421	31,989	16,355	10,632	14,276	13,155	3,916	5,615	1,251	5,279	60	87,842	1,084,100
Illinois	151,702	132,794	118,107	35,653	23,429	311	49,931	36,088	3,224	12,431	4,649	10,084	315	1,102	8,002	67	46,962	631,820
Michigan	226,244	112,912	34,670	25,702	26,903	12,234	2,339	18,777	36,877	10,814	3,769	2,974	3,356	4,865	806	57	22,301	545,231
Wisconsin	114,079	62,339	35,348	41,404	51,096	5	16,288	1,045	2,270	19,963	21,670	1,249	—	104	93	64	35,288	402,141
Total	1,387,501	618,604	402,224	202,235	194,134	163,689	100,673	87,173	71,460	66,776	43,924	27,276	22,754	16,205	14,974	156	202,534	3,621,156
West North Central	10-10-10	5-20-20	3-12-12	8-24-8	10-20-0	12-12-12	4-16-16	8-32-0	4-12-4	0-20-20	16-16-0	8-8-8	4-24-12	5-20-10	6-24-12			
Minnesota	13,767	34,935	6,268	17	4,663	185	38,946	8,733	—	23,878	180	5	19,006	10,147	33,940	61	87,337	281,544
Iowa	49,387	60,547	32,628	3,304	39,327	13,998	24,070	26,872	818	8,687	9,710	692	828	31,224	2,103	104	117,298	420,864
Missouri	44,632	4,364	57,933	77,110	3,598	74,661	8,827	80	50,061	21,465	2,112	48,656	18,943	—	—	61	56,265	468,735
North Dakota	302	158	267	24	841	35	797	10,388	—	55	123	—	2,052	136	3,741	35	4,141	23,056
South Dakota	152	106	17	60	6,391	35	29	1,768	4	32	2,240	—	123	46	183	46	8,204	19,399
Nebraska	857	143	96	666	13,685	1,286	24	10,345	102	752	20,023	23	361	27	—	43	17,360	65,946
Kansas	2,275	49	1,219	16,994	27,436	757	112	10,121	6,101	469	16,493	460	689	2	—	38	14,394	90,870
Total	111,342	100,302	98,418	98,395	95,939	90,966	72,805	68,007	56,917	55,033	52,830	49,816	42,001	41,582	39,875	159	268,996	1,343,116
East South Central	4-10-7	6-8-8	6-8-4	5-10-5	3-9-6	6-12-12	3-12-12	5-10-15	0-14-14	6-8-6	5-10-10	2-12-6	4-12-8	8-8-8	4-12-12			
Kentucky	—	1,438	—	4,460	29,510	5,149	66,198	68,202	2,265	56,474	28,730	46,489	41,741	10,705	586	64	92,838	452,773
Tennessee	1,429	5,582	3,533	4,410	90,533	104,944	30,035	3,031	627	1,981	18,462	5,567	8,704	8,322	3,112	70	104,471	395,132
Alabama	493,439	64,019	152,401	2,726	31	10	49	—	54,231	1,347	4	9	5	7,880	28,600	40	32,783	857,533
Mississippi	6,091	165,490	7,411	126,052	—	5	1,310	—	7,601	86	9,700	—	—	14,050	—	25	16,410	354,408
Total	500,958	236,529	163,445	137,647	120,174	110,108	97,582	71,233	64,924	59,890	56,896	51,065	50,450	40,957	32,298	131	246,700	2,059,846
West South Central	5-10-5	8-8-8	4-12-4	3-12-12	6-8-12	10-20-10	0-14-7	12-12-12	12-24-12	3-9-18	6-9-6	13-13-13	5-10-10	10-20-0	3-9-27			
Arkansas	63,176	5,632	9,264	3,210	36,302	9,089	1,332	7,650	1,302	18,316	61	2,104	1,193	23	10,406	57	24,738	193,797
Louisiana	34,125	32,968	13,621	23,942	607	2,014	1,602	12,880	3,039	146	14,736	4,368	4,040	31	7	37	25,236	173,362
Oklahoma	26,906	881	8,347	1,051	2	6,525	586	177	2,761	1,225	—	314	1,277	4,460	—	30	9,607	64,514
Texas	113,058	25,198	16,251	10,906	510	11,279	20,146	2,917	13,138	62	116	6,034	5,172	6,736	—	94	49,864	281,367
Total	237,265	64,679	47,483	39,109	37,421	28,907	23,668	23,624	20,240	19,764	14,913	12,820	11,682	11,440	10,413	158	109,642	713,080
Mountain	10-20-0	12-24-0	10-10-0	6-10-4	10-10-10	15-11-0	10-16-8	10-20-5	20-10-0	6-30-0	10-18-5	14-14-7	14-7-0	10-35-0	10-12-8			
Montana	2,803	—	—	225	—	—	1	—	—	790	268	—	—	—	—	19	347	4,234
Idaho	635	—	1,313	66	2	2,047	1,062	—	18	283	287	—	—	—	—	39	1,033	6,746
Wyoming	371	460	—	26	—	—	—	—	—	16	94	254	—	740	—	13	419	2,379
Colorado	745	7,197	—	199	618	—	977	—	—	177	362	34	—	114	809	31	3,456	16,690
New Mexico	370	—	31	66	7	—	—	—	—	—	—	—	286	—	—	18	1,377	2,147
Arizona	3,362	—	4,254	—	1,483	—	—	2,017	1,624	—	—	735	628	—	—	46	7,339	21,462
Utah	888	—	113	1,498	28	14	9	—	—	317	62	—	—	—	—	30	692	3,621
Nevada	123	—	—	467	—	—	—	—	—	—	—	87	—	—	—	13	196	875
Total	9,117	7,657	5,711	2,547	2,138	2,061	2,049	2,017	1,642	1,582	1,073	1,112	924	854	809	124	14,859	56,152
Pacific	10-10-5	17-7-0	8-8-4	6-10-4	8-10-12	10-10-10	16-8-4	10-16-8	5-10-10	8-8-6	16-10-0	4-10-10	6-20-20	10-12-10	10-20-20			
Washington	598	4	—	4,522	—	1,152	—	237	5,639	—	—	—	2,531	—	2,473	84	12,494	39,630
Oregon	136	15	2	1,042	—	538	362	7,597	1,507	—	—	—	1,709	—	1,227	54	7,844	21,979
California	27,318	19,267	18,454	6,094	10,205	8,023	7,894	65	94	6,669	5,810	5,264	11	3,772	2	584	102,322	221,264
Total	28,052	19,286	18,456	11,658	10,205	9,693	8,256	7,899	7,240	6,669	5,810	5,264	4,251	3,772	3,702	600	122,660	272,873
Territories 3/	14-2-8	12-6-10	14-4-10	15-4-7	12-4-10	13-3-12	6-8-10	10-10-8	6-6-10	10-6-14	9-10-5	12-3-16	12-10-5	16-4-5	12-2-10			
Puerto Rico	32,616	23,644	22,651	21,563	17,393	16,124	14,025	12,925	9,520	5,854	5,133	5,116	4,820	4,734	3,620	25	24,251	223,869

1/ Dashes indicate quantity of grade, if used, was less than 0.5 ton.
2/ The number of mixtures shown for each State and Region is exclusive of mixtures not specified by grade, although their tonnages are included in the totals.
3/ The total consumption in Hawaii was 59,164 tons of mixed goods, comprising 101 grades, which were manufactured to consumer's specifications. Data for Alaska not available. In 1952-53, the number of mixtures reported were nine, totaling 136 tons.

which have a low content of primary nutrients.

The quantities of primary nutrients in fertilizers are based on the average analyses of the various products as published by fertilizer control officials for the state in which they were consumed, rather than on the manufacturers' guarantees.

Thus, the overruns or underruns of nutrients from the guarantees are taken into account. This gives more nearly the actual tonnages of nutrients than would be the case if only the guarantees were used. The actual nutrient content usually averages somewhat higher than the guarantee.

Fertilizers consumed in the U.S. and territories in 1953-54 contained 1,847,416 tons of nitrogen, 2,242,100 tons of available P_2O_5 (2,646,971 tons of total P_2O_5), and 1,806,042 tons of K_2O (Table 6).

Compared with 1952-53, the quantity of nitrogen increased 210,360 tons (12.85%) and of K_2O 67,792 tons (3.90%), while available P_2O_5 and total P_2O_5 decreased 28,650 tons (1.26%) and 118,317 tons (4.28%), respectively.

The annual consumption of primary nutrients in the U.S. and territories for 1943-44 to 1953-54 is shown in the graph on page 1. During the period 1945-46 to 1949-50 the consumption of nitrogen increased at the rate of approximately 75,000 tons annually, whereas the annual rate of increase in subsequent years was about 210,000. In general, the consumption of K_2O has paralleled that of nitrogen, but with a decreasing trend in the annual rate of increase since 1950-51.

It will be noted that in 1953-54 the consumption of K_2O was lower than that of nitrogen for the first time during the period 1943-44 to 1953-54. Also, for the first time during this period, the consumption of available P_2O_5 took a downward turn in 1953-54.

The quantities and proportions of the nutrients consumed as mixed fertilizers in 1953-54 were 778,099 tons (42.12%) for nitrogen, 1,801,423 tons (80.35%) for available P_2O_5, 1,930,260 tons (72.92%) for total P_2O_5 and 1,596,032 tons (88.37%) for K_2O. The quantities of nitrogen, avail-

Table 4—Principal Materials Used as Such[1]

Tons

State & Region	Chemical Nitrogen Materials: Ammonium Nitrate	Ammonium Sulfate	Calcium Cyanamide	Sodium Nitrate	Other 2/	Natural Organics: Dried Manures	Other 2/	Phosphate Materials: Phosphate Rock 3/	Superphosphates: Grades 22 Percent and Under	Grades Over 22 Percent	Other 2/	Potash Materials: Chlorides 50 & 60 Percent Grades	Other 2/	Total Primary Nutrient Materials	Secondary and Trace Element Materials 2/
Maine	1,237	78	364	281	23	412	247	26	4,303	0	140	34	80	6,984	78
New Hampshire	830	25	45	129	68	166	420	34	2,007	0	67	64	20	3,978	33
Vermont	407	2	6	169	160	62	64	80	9,604	0	38	216	17	10,847	30
Massachusetts	1,144	87	300	1,136	161	1,062	6,768	319	3,809	0	778	488	0	15,763	139
Rhode Island	79	87	132	189	25	209	739	49	334	0	142	76	3	1,998	19
Connecticut	384	36	92	736	66	1,406	15,047	106	4,438	39	1,066	1,076	1,271	24,764	269
New England	4,390	298	788	2,882	499	4,116	21,108	618	24,395	39	2,330	1,943	1,331	64,296	846
New York	14,419	389	2,606	5,787	2,368	3,241	9,768	1,276	68,730	181	1,221	913	801	95,358	948
New Jersey	2,380	168	1,932	2,860	1,728	2,710	3,194	1,341	5,709	174	1,087	1,406	144	24,711	259
Pennsylvania	4,355	2,073	1,862	1,798	1,609	2,960	6,713	7,962	36,909	31	3,106	876	107	70,232	2,588
Delaware	3,136	24	366	167	1,796	135	309	104	728	80	100	290	35	8,980	120
District of Columbia	0	4	0	64	6	114	386	0	29	40	133	3	0	780	3
Maryland	1,472	114	1,386	3,682	1,762	731	679	1,677	6,239	12	446	365	1,989	20,233	386
West Virginia	786	382	9	1,787	384	399	672	466	4,292	48	79	87	1	9,299	35
Middle Atlantic	26,536	3,762	7,600	16,110	9,672	10,271	21,613	12,827	106,634	564	6,143	3,610	2,787	226,609	4,188
Virginia	8,237	184	1,440	30,300	27,661	889	1,032	3,427	9,977	301	1,146	1,605	14,681	97,489	16,463
North Carolina	16,081	348	6,873	141,248	115,489	380	1,887	1,966	17,395	89	10,044	10,380	10,624	333,791	24,702
South Carolina	24,861	679	1,629	99,164	86,780	400	798	1,612	20,247	3	8,396	19,066	3,944	266,384	2,744
Georgia	26,426	1,177	1,980	93,618	73,489	889	745	770	16,688	277	18,612	10,496	3,358	264,898	21,433
Florida	10,048	4,008	2,287	17,020	22,274	784	6,738	15,893	7,645	140	5,338	2,806	17,688	110,185	2,366
South Atlantic	81,642	6,394	14,029	381,848	333,503	3,057	10,980	21,297	73,150	810	40,736	44,333	50,295	1,082,724	60,369
Ohio	13,687	7,655	1,673	1,122	10,380	1,179	6,300	9,876	16,369	3,620	678	2,276	1,287	76,807	519
Indiana	48,919	8,811	2,616	270	27,723	1,048	1,676	27,012	17,141	5,656	890	19,978	412	156,141	697
Illinois	36,842	38,037	1,300	117	46,586	4,687	7,184	563,876	84,420	12,067	8,303	95,155	261	873,968	786
Michigan	13,000	6,488	311	664	4,314	2,973	8,870	3,507	11,761	361	896	1,195	865	54,310	851
Wisconsin	5,692	164	84	0	2,562	968	6,034	12,836	2,510	136	103	3,943	572	38,887	233
East North Central	118,200	56,589	5,986	2,173	91,842	10,906	30,263	617,105	111,521	21,739	10,267	120,836	3,088	1,198,647	2,887
Minnesota	13,249	1,048	38	6	30,744	828	3,608	8,100	10,796	17,873	6,989	1,346	0	70,907	384
Iowa	49,140	4,907	284	0	47,423	147	3,218	23,423	82,272	10,670	32,632	6,739	369	331,222	72
Missouri	44,006	8,249	20	348	35,920	890	2,331	188,644	8,387	4,940	8,083	10,811	1,179	387,780	138
North Dakota	488	70	0	0	65	0	31	40	90	14,319	8,825	14	0	24,898	80
South Dakota	3,206	400	3	7	1,835	0	106	161	1,861	4,997	4,139	13	2	16,608	0
Nebraska	40,784	4,046	0	0	47,308	1,761	909	4,363	4,490	17,068	11,162	128	0	132,884	886
Kansas	28,384	5,945	0	0	11,609	251	1,321	7,906	3,356	23,933	35,047	776	0	118,209	110
West North Central	179,801	25,665	348	359	182,923	3,714	11,530	200,249	81,440	94,104	103,907	27,827	1,680	879,879	1,267
Kentucky	29,708	1,272	1,699	2,321	3,966	330	219	8,133	46,665	4,300	12,133	8,916	9,315	129,704	106
Tennessee	37,049	370	1,054	10,768	9,318	762	781	626	30,098	6,303	18,038	10,369	5,102	129,870	392
Alabama	62,002	1,280	884	99,370	46,880	487	300	3,418	39,631	437	69,950	10,366	130	344,912	1,049
Mississippi	113,097	6,960	11,846	60,255	56,338	18	0	6,783	37,938	1,673	60,583	22,331	209	380,298	85
East South Central	233,365	9,882	15,083	179,419	118,289	1,560	1,170	18,966	144,322	12,413	160,664	52,772	14,756	982,481	1,572
Arkansas	30,150	10,369	12,086	32,088	23,546	48	0	2,890	16,609	4,570	3,209	31,179	983	276,874	6
Louisiana	33,496	11,229	1,061	34,144	25,464	156	413	3,230	16,063	1,406	12,829	6,739	79	144,298	512
Oklahoma	11,689	2,671	0	413	3,029	701	449	14,106	32,446	6,319	8,368	1,474	20	80,376	100
Texas	33,652	40,673	1,925	2,576	23,634	2,229	3,351	10,246	74,868	17,827	50,633	1,269	31	276,963	2,625
West South Central	112,736	66,238	15,061	83,218	83,872	3,135	4,213	30,162	139,986	30,122	76,080	40,661	1,009	676,628	3,248
Montana	8,380	2,736	0	0	0	20	0	0	10	13,384	2,796	10	0	34,184	686
Idaho	13,784	19,127	872	0	1,077	68	30	6	12,664	10,475	11,116	86	2	77,670	6,530
Wyoming	1,089	487	0	0	389	3	44	0	315	4,794	741	0	0	7,772	1,061
Colorado	8,493	2,189	0	0	3,775	436	681	300	1,655	14,045	3,141	170	65	31,765	1,299
New Mexico	1,488	706	0	1	2,673	33	682	0	4,831	4,338	4,010	0	0	20,200	15
Arizona	13,690	25,087	872	969	36,915	1,530	623	40	4,969	4,110	23,888	36	658	112,888	20,841
Utah	4,487	5,065	0	0	1,076	207	221	0	4,031	4,664	1,486	28	0	24,463	313
Nevada	148	408	0	12	386	29	106	0	164	544	864	3	0	2,841	3,741
Mountain	65,167	56,810	1,290	982	47,891	2,326	2,387	240	28,586	65,072	48,076	342	725	301,833	35,612
Washington	32,687	28,334	319	204	21,220	453	2,121	860	8,595	7,676	16,377	2,431	134	128,272	48,369
Oregon	23,538	30,760	638	0	10,086	625	871	280	11,774	2,866	22,128	1,436	74	110,722	14,698
California	71,079	172,230	5,581	243	187,283	4/ 220,000	84,309	1,604	51,948	11,615	86,393	1,300	4,250	867,574	435,828
Pacific	127,194	241,324	6,538	447	218,589	220,077	87,101	2,734	72,317	22,149	124,898	5,167	4,457	1,109,969	497,896
Continental U. S.	864,734	469,023	60,213	662,983	1,046,240	259,659	160,128	911,082	781,381	247,061	591,088	297,397	80,143	6,486,683	615,423
Hawaii	0	30,328	0	122	24,533	9	70	894	5,236	40	5,474	12,178	1,620	80,724	90
Puerto Rico	0	39,366	0	0	6,989	0	1	0	340	41	741	160	35	47,583	0
Alaska 5/	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Territories	0	69,893	0	122	31,303	9	71	894	5,576	81	6,215	12,338	1,655	128,347	90
Total: 1953-54	864,736	538,716	60,213	663,105	1,077,633	259,668	160,200	912,076	786,957	247,142	590,141	309,735	81,818	6,610,910	615,513
1952-53	848,252	536,749	62,219	647,433	876,096	207,127	151,910	1,176,962	1,066,687	245,850	632,696	282,465	74,461	6,512,897	577,487
1951-52	799,189	480,517	62,384	681,701	872,903	196,736	145,089	1,160,080	1,224,890	225,059	704,787	264,876	73,548	6,561,019	785,080

1/ Includes materials distributed by Government agencies. Excludes lime and materials used by manufacturers in the formulation of commercial mixtures.
2/ The principal commodities are shown in Table 5, by regions.
3/ Includes colloidal phosphate, the quantity of which is shown separately, by regions, in Table 8.
4/ Estimated.
5/ Not available.

Table 6—Consumption of Primary Plant Nutrients[1]

Tons

State & Region	In Mixtures: Nitrogen	P_2O_5 Available	P_2O_5 Total	K_2O	Total N, Avail. P_2O_5, & K_2O	In All Fertilizers: Nitrogen	P_2O_5 Available 2/	P_2O_5 Total 3/	K_2O	Total N, Avail. P_2O_5 & K_2O
Maine	11,046	17,576	18,586	20,397	49,019	11,620	18,471	19,305	20,435	60,5[illegible]
New Hampshire	688	1,427	1,515	1,553	3,606	1,021	1,875	1,987	1,604	4,49[illegible]
Vermont	1,191	3,665	3,793	4,953	9,809	1,414	5,740	6,084	5,089	12,24[illegible]
Massachusetts	4,044	6,469	6,752	6,511	17,024	5,189	7,606	8,006	6,881	19,57[illegible]
Rhode Island	736	1,340	1,419	1,356	3,432	889	1,468	1,564	1,410	3,76[illegible]
Connecticut	3,764	5,678	6,041	6,209	15,651	5,110	7,394	7,863	7,552	20,06[illegible]
New England	21,407	36,155	37,904	40,979	98,541	25,243	42,551	44,776	42,971	110,76[illegible]
New York	29,265	57,826	60,410	46,512	133,603	37,290	69,196	72,596	47,411	153,69[illegible]
New Jersey	14,027	27,751	29,172	26,604	68,382	16,748	29,330	31,136	27,575	73,66[illegible]
Pennsylvania	28,378	72,700	75,579	62,683	163,761	32,046	81,256	86,554	63,387	176,63[illegible]
Delaware	4,502	9,646	10,265	10,016	24,163	5,800	10,081	10,841	10,219	26,10[illegible]
District of Columbia	110	182	196	123	415	154	252	266	129	5[illegible]
Maryland	12,686	33,063	35,172	28,189	73,930	14,812	34,526	37,166	28,491	77,8[illegible]
West Virginia	2,689	8,398	9,100	6,312	17,399	3,452	9,372	10,244	6,359	19,18[illegible]
Middle Atlantic	91,459	209,755	219,894	180,439	481,653	110,299	234,016	248,506	183,541	527,8[illegible]
Virginia	24,283	75,356	80,482	69,666	169,305	37,246	78,147	84,335	71,976	187,3[illegible]
North Carolina	59,297	141,628	152,710	125,648	326,573	115,840	146,514	158,331	133,517	395,87[illegible]
South Carolina	25,316	66,675	71,896	66,492	158,483	68,065	71,684	77,210	68,673	208,42[illegible]
Georgia	44,865	104,990	113,436	99,478	249,323	86,500	110,421	119,377	106,374	303,29[illegible]
Florida	58,780	82,118	97,566	78,915	219,613	72,876	84,869	106,334	82,536	240,28[illegible]
South Atlantic	212,541	470,767	515,790	430,199	1,113,497	382,224	491,635	545,587	463,076	1,336,93[illegible]
Ohio	41,661	130,336	139,452	129,078	301,075	53,323	136,607	147,768	130,873	319,80[illegible]
Indiana	44,600	140,821	149,618	150,456	335,777	74,504	146,071	156,002	152,423	384,99[illegible]
Illinois	32,913	84,789	90,297	94,496	212,198	82,166	124,109	293,239	161,986	368,2[illegible]
Michigan	22,360	76,413	81,165	75,467	174,240	30,831	79,505	85,350	76,464	186,80[illegible]
Wisconsin	14,517	58,516	62,200	69,213	142,246	19,736	59,755	67,086	71,603	151,2[illegible]
East North Central	155,951	490,885	522,980	518,700	1,165,536	260,560	547,047	750,454	593,510	1,401,11[illegible]
Minnesota	12,187	50,726	53,094	36,724	99,637	24,303	64,881	69,089	37,556	126,6[illegible]
Iowa	28,766	75,396	78,621	41,385	145,545	76,119	106,398	112,932	46,525	224,0[illegible]
Missouri	33,281	70,106	75,728	52,470	155,856	72,523	80,929	132,382	64,226	217,67[illegible]
North Dakota	1,663	6,191	6,496	1,266	9,110	2,924	16,541	17,166	1,275	20,74[illegible]
South Dakota	1,328	2,779	2,991	208	4,313	4,311	6,579	6,856	217	11,10[illegible]
Nebraska	7,452	13,371	15,620	1,583	22,406	56,696	26,172	27,009	1,698	79,5[illegible]
Kansas	9,719	20,244	21,431	3,496	33,458	33,262	41,890	45,768	3,979	79,13[illegible]
West North Central	94,388	238,813	251,881	137,131	470,328	266,087	336,500	411,306	164,476	758,90[illegible]
Kentucky	19,200	50,528	56,424	48,186	117,896	31,908	66,509	74,329	57,961	156,4[illegible]
Tennessee	16,832	44,372	47,923	36,615	99,619	38,744	56,664	59,667	46,086	140,4[illegible]
Alabama	35,282	84,499	91,205	63,745	183,526	80,634	101,709	110,923	70,288	252,6[illegible]
Mississippi	20,334	33,797	36,423	26,793	80,924	112,299	48,570	53,888	39,536	200,4[illegible]
East South Central	91,648	213,156	230,975	177,311	482,155	263,585	272,822	299,027	213,868	749,9[illegible]
Arkansas	10,648	21,210	22,644	22,690	54,548	52,108	27,610	29,687	41,046	120,8[illegible]
Louisiana	10,973	19,922	21,214	15,689	46,584	49,574	25,808	29,299	19,574	94,9[illegible]
Oklahoma	4,136	9,368	9,849	3,888	17,392	11,435	21,418	25,764	4,799	37,6[illegible]
Texas	17,755	35,174	37,064	18,771	71,700	68,659	70,142	77,942	19,623	158,4[illegible]
West South Central	43,512	85,674	90,771	61,038	190,224	181,780	144,869	161,682	85,041	411,6[illegible]
Montana	397	880	996	42	1,338	3,141	8,037	8,578	49	11,21[illegible]
Idaho	701	926	980	136	1,763	12,484	14,996	16,070	191	27,6[illegible]
Wyoming	287	564	612	44	895	1,097	3,011	3,092	44	4,1[illegible]
Colorado	1,632	3,286	3,380	530	5,448	7,005	11,719	11,969	680	19,40[illegible]
New Mexico	246	322	341	49	617	4,086	4,567	4,704	84	8,70[illegible]
Arizona	2,586	3,241	3,363	627	6,454	32,495	12,336	12,561	966	46,7[illegible]
Utah	300	570	698	107	977	4,880	3,960	4,098	134	8,67[illegible]
Nevada	68	109	118	37	214	414	546	568	40	1,0[illegible]
Mountain	6,197	9,887	10,361	1,572	17,706	65,312	59,164	61,636	2,148	126,6[illegible]
Washington	2,087	3,944	4,089	3,187	9,168	36,243	13,704	14,297	4,709	54,6[illegible]
Oregon	2,020	3,382	3,609	2,109	7,511	25,640	12,334	12,858	3,028	41,0[illegible]
California	23,858	22,037	22,973	12,294	58,189	172,965	65,715	69,184	20,300	258,9[illegible]
Pacific	27,915	29,363	30,671	17,590	74,868	234,848	91,753	96,339	28,037	354,6[illegible]
Continental U. S.	746,012	1,784,534	1,911,197	1,564,959	4,094,505	1,759,588	2,221,946	2,624,291	1,766,676	5,776,5[illegible]
Hawaii	6,180	5,269	5,754	9,334	20,783	20,964	8,324	9,180	17,513	46,8[illegible]
Puerto Rico	26,907	11,620	13,309	21,739	60,266	26,864	11,830	13,620	21,853	70,3[illegible]
Alaska 4/	—	—	—	—	—	—	—	—	—	—
Territories	33,087	16,889	19,063	31,073	81,049	87,828	20,154	22,680	39,366	117,0[illegible]
Total: 1953-54	778,099	1,801,423	1,930,260	1,596,032	4,175,554	1,847,416	2,242,100	2,646,971	1,806,042	5,895,5[illegible]
1952-53 5/	726,096	1,762,266	1,920,472	1,552,041	4,062,422	1,637,056	2,270,750	2,765,288	1,738,250	5,646,0[illegible]
1951-52	646,223	1,680,706	1,906,523	1,420,396	3,749,323	1,422,180	2,199,376	2,678,070	1,661,467	5,203,0[illegible]

1/ Includes Government distribution.
2/ Includes, as available P_2O_5, 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application.
3/ Includes, as total P_2O_5, 22 percent of the colloidal phosphate and 32 percent of the phosphate rock marketed for direct application.
4/ Not available. In 1952-53, total primary plant nutrients in all fertilizers amounted to 273 tons.
5/ Revised. Excess quantities of 1,860 tons of K_2O in mixtures in Kansas and 2,702 tons of total P_2O_5 in all fertilizers in Idaho were reporte[d] for 1952-53.

Table 7—Weighted Average Plant Food Content[1]

State & Region	Mixtures 2/: N	Available P_2O_5	K_2O	Total Nutrients	Materials, Single Nutrient 3/: N	Available P_2O_5 4/	K_2O	Multiple Nutrients 2/	Total Nutrients	Total Nutrients in Mixtures and Materials
Maine	6.70	10.67	12.38	29.75	28.61	19.91	58.42	12.25	21.67	29.43
New Hampshire	5.29	12.07	13.13	30.49	29.54	20.36	63.56	10.41	22.45	28.47
Vermont	4.32	13.30	17.97	35.59	28.44	21.28	60.87	13.87	22.44	31.87
Massachusetts	5.86	9.36	9.42	24.65	18.76	18.46	60.36	11.29	16.82	23.18
Rhode Island	5.47	9.96	10.06	25.51	17.63	17.86	59.07	11.96	16.82	24.39
Connecticut	5.77	8.71	9.52	24.00	21.33	22.21	56.45	13.07	17.79	22.29
New England	6.06	10.27	11.64	27.99	22.73	20.56	57.69	12.48	19.01	26.61
New York	5.70	11.27	9.06	26.03	25.82	20.01	55.02	10.05	21.28	26.29
New Jersey	5.27	10.43	10.00	25.70	24.14	17.01	57.07	11.38	21.32	25.33
Pennsylvania	4.67	11.95	10.31	26.93	25.06	17.35	57.07	10.06	18.37	26.04
Delaware	4.86	11.09	11.28	27.22	34.49	22.59	59.82	9.06	32.35	27.54
District of Columbia	5.77	9.54	6.45	21.76	13.37	36.09	60.56	13.02	16.18	19.88
Maryland	4.34	11.32	9.65	25.31	24.66	16.63	12.66	12.08	19.27	24.92
West Virginia	3.96	12.38	9.30	25.64	21.62	19.22	59.74	9.92	19.18	24.86
Middle Atlantic	4.98	11.41	9.82	26.21	25.65	18.61	41.62	10.47	20.39	25.67
Virginia	3.54	11.00	10.17	24.71	19.91	18.43	14.06	10.13	18.53	23.94
North Carolina	3.98	9.50	8.43	21.91	19.96	16.18	37.36	11.62	20.67	21.68
South Carolina	3.77	9.92	8.41	22.10	20.10	16.22	53.21	20.26	22.50	22.21
Georgia	4.07	9.52	9.02	22.61	22.11	16.02	54.53	19.77	22.86	22.65
Florida	5.49	7.66	7.36	20.51	22.09	9.02	42.35	15.46	18.58	20.33
South Atlantic	4.23	9.37	8.57	22.17	20.66	14.99	40.16	15.63	21.22	22.01
Ohio	4.09	12.80	12.68	29.57	32.45	16.80	49.15	10.91	24.80	29.24
Indiana	4.34	13.75	14.69	32.78	36.07	14.19	58.58	9.99	31.52	32.62
Illinois	5.21	13.43	14.96	33.60	40.34	5.97	61.40	11.23	16.71	23.80
Michigan	4.10	14.01	13.84	31.95	31.94	16.62	51.37	9.11	23.13	31.16
Wisconsin	3.61	14.56	17.21	35.37	37.38	6.56	56.52	9.74	23.30	34.31
East North Central	4.31	13.56	14.32	32.19	37.17	7.16	60.22	10.28	19.65	29.07
Minnesota	4.84	20.16	14.60	39.60	45.45	34.11	59.44	26.97	38.08	39.27
Iowa	6.83	17.91	9.83	34.57	42.53	21.32	57.69	36.42	33.95	34.36
Missouri	7.10	14.96	11.19	33.25	44.27	5.74	56.35	23.27	21.46	26.77
North Dakota	7.17	26.86	5.49	39.51	33.17	45.36	60.50	51.76	47.29	43.52
South Dakota	9.90	20.74	1.56	32.19	44.69	39.69	55.10	37.62	40.91	37.01
Nebraska	11.30	20.26	2.40	33.96	47.29	35.66	60.50	33.23	43.11	40.08
Kansas	9.76	20.33	3.51	33.60	41.99	33.02	57.36	41.93	39.50	36.67
West North Central	7.03	17.78	10.21	35.02	44.55	18.96	58.26	38.50	32.80	34.14
Kentucky	4.36	11.16	10.64	26.04	32.69	22.66	53.73	7.89	29.97	26.91
Tennessee	4.26	11.23	9.77	25.26	32.74	24.93	49.50	14.50	31.63	26.82
Alabama	4.21	10.09	7.61	21.91	22.69	12.57	59.27	13.61	20.03	21.36
Mississippi	5.74	9.54	7.56	22.84	36.66	13.83	56.04	30.65	31.42	27.28
East South Central	4.49	10.46	8.69	23.63	30.69	16.62	54.43	13.94	27.26	24.61
Arkansas	5.49	10.94	11.71	28.14	34.64	23.52	57.07	37.60	37.36	32.56
Louisiana	6.33	11.49	9.06	26.87	36.61	16.78	57.20	34.45	33.52	29.69
Oklahoma	6.41	14.52	6.03	26.96	36.25	18.96	59.44	35.64	25.20	25.98
Texas	6.31	12.60	6.57	25.48	39.46	21.29	59.22	34.87	31.31	28.37
West South Central	6.10	12.01	8.56	26.67	36.69	20.37	57.24	35.04	32.64	29.58
Montana	9.38	21.23	0.99	31.60	29.17	47.33	60.50	43.18	40.70	39.47
Idaho	10.33	13.64	2.00	25.97	28.91	34.31	61.39	44.66	33.37	32.78
Wyoming	11.22	24.55	1.85	37.62	37.49	44.44	0	36.62	41.91	40.90
Colorado	11.11	22.37	3.61	37.09	46.26	44.41	59.15	13.62	43.91	41.75
New Mexico	11.46	15.00	2.28	28.74	56.18	32.77	0	35.91	40.06	38.96
Arizona	12.06	16.10	2.92	30.07	34.46	35.90	60.36	35.21	34.84	34.08
Utah	8.26	15.74	2.96	26.97	29.62	33.71	60.50	33.32	31.44	30.87
Nevada	7.79	12.48	4.24	24.51	23.53	36.59	60.50	33.25	30.93	29.29
Mountain	11.03	17.68	2.80	31.51	34.14	38.48	54.34	37.26	36.12	35.40
Washington	6.87	13.31	10.76	30.94	36.64	31.43	58.57	36.35	36.31	35.28
Oregon	9.19	15.39	9.59	34.17	28.37	24.49	59.97	37.80	30.25	30.90
California	10.78	9.96	5.56	26.30	30.51	26.69	52.51	12.87	23.14	23.78
Pacific	10.23	10.76	6.45	27.44	31.15	27.18	55.37	15.41	25.34	25.76
Continental U. S.	4.88	11.70	10.26	26.84	31.05	15.69	53.80	17.32	25.95	26.57
Hawaii	10.44	8.91	15.78	35.13	25.52	18.47	59.28	46.59	32.20	33.44
Puerto Rico	12.02	5.19	9.71	26.92	20.80	23.22	56.68	21.96	20.99	25.88
Alaska 5/	—	—	—	—	—	—	—	—	—	—
Territories	11.69	5.97	10.96	28.64	23.36	18.73	59.27	45.29	28.05	28.45
U. S. Average: 1953-54	5.01	11.59	10.27	26.87	30.81	16.70	54.01	17.53	25.99	26.61
1952-53	4.63	11.34	6/ 9.87	6/ 25.84	28.54	14.45	51.89	21.96	23.24	6/ 25.06
1951-52	4.30	11.14	9.42	24.86	27.96	14.71	49.96	20.97	22.16	24.04

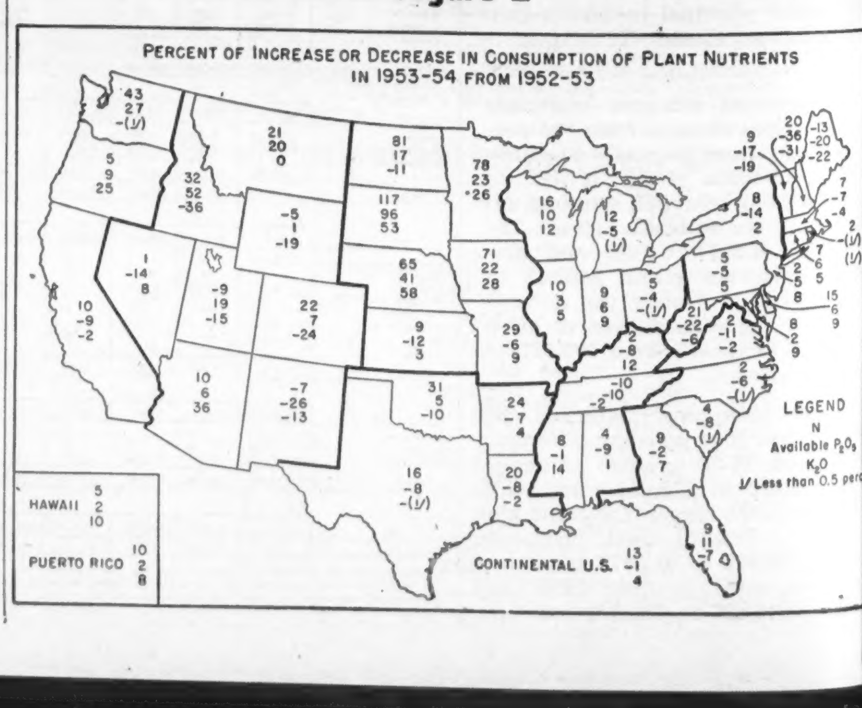
1/ Excludes materials not guaranteed to contain N, P_2O_5, or K_2O.
2/ Guaranteed to contain two or more of the primary plant nutrients, N, P_2O_5, or K_2O.
3/ Guaranteed to contain only one of the primary plant nutrients.
4/ Includes the available P_2O_5 content of colloidal phosphate and phosphate rock as 2 percent and 3 percent, respectively.
5/ Not available.
6/ Revised.

Table 6a—Distribution of Nutrient Consumption

(As Percentages of Respective Totals in Mixtures and Materials, Yea[r] Ended June 30, 1954)

Region—	N: Mixtures	N: Materials	Available P_2O_5: Mixtures	Available P_2O_5: Materials	K_2O: Mixtures	K_2O: Materia[ls]
New England	2.75	0.36	2.01	1.45	2.57	0.95
Mid. Atlantic	11.75	1.76	11.64	5.51	11.31	1.48
So. Atlantic	27.32	15.87	26.13	4.74	26.95	15.65
East No. Cent.	20.04	9.78	27.25	12.74	32.50	35 63
West No. Cent.	12.13	16.05	13.26	22.60	8.59	8.26
East So. Cent.	11.78	16.08	11.83	13.46	11.11	17.41
West So. Cent.	5.59	12.93	4.76	13.43	3.82	11.43
Mountain	0.80	5.53	0.55	11.17	0.10	0.27
Pacific	3.59	19.35	1.63	14.16	1.10	4.97
Territories	4.25	2.29	0.94	0.74	1 95	3.95
U S.	100.00	100.00	100.00	100.00	100.00	100.00

Figure 2



ble P_2O_5, total P_2O_5 and K_2O consumed as mixed fertilizers were, respectively, 6.87, 1.07, 0.51, and 2.83% greater than in 1952-53.

The quantities and proportions of the nutrients consumed as fertilizer materials in 1953-54 were 1,069,317 tons (57.88%) for nitrogen, 440,677 tons (19.65%) for available P_2O_5, 216,711 tons (27.08%) for total P_2O_5, and 210,010 tons (11.63%) for K_2O.

The quantities of nitrogen and K_2O consumed as materials were, respectively, 17.64 and 12.78% greater than in 1952-53, while the quantities of available P_2O_5 and total P_2O_5 were respectively, 9.78 and 15.16% less.

The total primary nutrient content of mixed fertilizers consumed in 1953-54 amounted to 4,175,554 tons, or 2.78% more than the consumption (4,062,422 tons) in 1952-53. The total primary nutrient content of fertilizer materials in 1953-54 was 1,720,004 tons, or 8.61% more than that (1,583,634 tons) in 1952-53.

The 1953-54 consumption of fertilizer materials containing primary nutrients was 195,987 tons (2.88%) less than in 1952-53. The consumption of all fertilizers (materials and mixtures) containing primary nutrients was 1.67% below the 1952-53 level, whereas the total quantity of primary nutrients supplied by these fertilizers increased 4.42 percent.

The percentage change in consumption of primary nutrients in 1953-54 as compared with 1952-53 is shown by states and other political units in Figure 2. Percentage increases in nitrogen were generally highest in the West North Central and the West South Central States.

These regions consumed 17.72% of the total primary nutrients in mixed fertilizers and 28.98% of the total in materials (Table 6a). The percentage change in nitrogen consumption ranged from a decrease of 13.08% in Maine to an increase of 117.18% in South Dakota. Wide variations are also shown in the percentage changes in the consumption of P_2O_5 and K_2O.

Langbourne M. Williams

HEADS BOARD — Langbourne M. Williams, Freeport Sulphur Co., was elected chairman of the National Industrial Conference Board at the Board's 39th Annual Meeting held in New York recently. Mr. Williams was vice president and treasurer of Freeport Sulphur Co. from 1930 to 1933, and has been president since 1933.

TENT CATERPILLAR INVASION

PHILADELPHIA — Spraying programs are under way in the area to combat an infestation of tent caterpillars. Lower Merion Township recently completed a program covering more than 7,000 acres. Spraying also is being carried out in the Abington, Jenkintown and Huntingdon Valley areas and portions of Delaware and Montgomery counties.

RESEARCH GROUP

(Continued from page 1)

crop land or the level of consumption already realized in some neighboring areas, he said.

Present and future ammonia plant installations indicate a more acute oversupply of this particular chemical, Mr. Messing said. An oversupply of insecticides, weed killers and other agricultural chemicals has worried the industry for some time, he said.

The Federal Reserve Board's organic chemicals production index will be about 220 by 1960 in contrast to the present level of 155, said Shea Smith 3d, assistant director of marketing research, Monsanto Chemical Co.

Sales of the six leading inorganic chemicals will increase about 5% each year for the next five years, according to Edwin M. Ott, product manager of the industrial chemical division of Pennsylvania Salt Manufacturing Co. and new president-elect of the association.

The six chemicals (sulphuric acid, ammonia, phosphoric acid, caustic soda, chlorine and soda ash) accounted for half of the inorganic chemical industry's production value of $2.5 billion last year, he said. Production of these chemicals in the last ten years has shown a yearly increase of 12%, Mr. Ott said.

A predicted sales gain of 4% for the entire chemical industry for 1955, as compared to 1954, appeared conservative to Howard S. Bunn, executive vice president of Union Carbide & Carbon Corp.

The association's new president is C. P. Neidig of White, Weld & Co., Philadelphia, who succeeds S. D. Koonce, Jefferson Chemical Co., New York. Elected secretary was William D. Morrison, Celanese Corp. of America, New York. F. Scott Gordon, Victor Chemical Works, New York, is treasurer.

Directors include Mr. Koonce; W. H. Healey, General Aniline & Film Corp., New York; Parker Friselle, Dow Chemical Co., Midland, Mich.; D. L. Taylor, Hooker Electrochemical Co., Niagara Falls, N.Y.; and L. H. Flett, consultant and formerly with Allied Chemical & Dye Corp., New York.

James G. Park, vice president and director of Enjay Co., Inc., New York, received the association's Memorial Award.

Great Plains Ammonia Group Plans Trade Show, Field Day

JEFFERSON, IOWA — Great Plains Agricultural Ammonia Assn. Midwest Trade Show and Field Day has been set for July 20-21. A business session and show for members only will be held July 20 at Hotel Ft. Des Moines, Des Moines.

The field day, which is being held in cooperation with Iowa State College, will be held at Ames, July 21. It is open to the public. Details and reservations may be secured by writing to James Andrews, secretary, Great Plains Agricultural Ammonia Assn., Box 447, Jefferson. Iowa.

ESCAMBIA BAY GROUND BREAKING — More than 100 civic and industry leaders in Northwest Florida joined officials of Escambia Bay Chemical Corp. in officially breaking ground for the firm's petrochemical plant now under construction between Milton and Pensacola. Cost of the plant including other facilities to be built later will exceed $25 million. Pictured here with M. A. Abernathy, Escambia Bay president, center, are E. L. Stokes, left, chief accountant, and A. J. Bruno, chief engineer for the newly-organized company.

ESCAMBIA BAY

(Continued from page 1)

Completion of construction work by Chemical Construction Corp., New York, contractors, is scheduled for January, 1956. When in full operation, the plant will employ more than 200 people.

The 100-acre site on which the facility is being constructed is part of a tract of approximately 2,100 acres in Santa Rosa County purchased recently by Escambia Bay.

Already approved is an addition to the two basic production units which will add polyvinyl chloride to the plant's products.

Escambia Bay Chemical Corp. was organized in October, 1954, by United Gas Corp., Shreveport; Electric Bond and Share Co., New York, and National Research Corp., Cambridge, Mass.

Officers of the new firm, all officials of the United Gas Corp., are M. A. Abernathy, president; J. H. Miracle, vice president; L. V. Tracht, treasurer; E. J. Freiberg, secretary, and A. L. McClellan, assistant treasurer.

Directors of Escambia Bay Chemical Corp. include Mr. Abernathy; N. C. McGowen, president of United Gas Corp.; George G. Walker, president of Electric Bond and Share Co.; A. A. Talmage, vice president, Electric Bond & Share Co.; Richard Morse, president of National Research Corp.; and Saunders Gregg and J. C. Ohrt, both of United Gas Corp.

HITCHHIKERS ON THE WIND

WASHINGTON—Pink Bollworm Moths are weak flyers—but they can soar for miles by hitchhiking on the wind. U.S. Department of Agriculture scientists believe the moths' ability to ride air currents makes their spread across the Cotton Belt harder to control. Since 1951, this tightly quarantined pest has moved into about 90 previously uninfested counties in Texas and nearby states—mostly by air, the scientists think. They have good grounds for this belief. P. A. Glick, entomologist with Agricultural Research Service, has trapped a dozen pink bollworm moths at altitudes of 100 to 1,000 feet in 37 flights over southern Texas. One of the highest-flying moths was caught over a desolate area of cactus, mesquite, and grass—15 miles from the nearest cotton field.

Firman E. Bear To Speak at Young Farmer Banquet

MINNEAPOLIS — Dr. Firman E. Bear, editor-in-chief, of Soils Science magazine and recently retired chairman of the Soils Department at Rutgers University, will be the featured speaker at the Four Outstanding Young Farmers Award banquet June 2 at the Nicollet Hotel here. He will speak on the subject "Land, Food, and People."

Dr. Bear's address will be the climax of a three day awards program for 41 young farmers being honored by Minneapolis businesses and industries. At the same banquet, four of these young men will be named the country's Four Outstanding Young Farmers.

The program is part of a national project sponsored jointly by the U.S. Junior Chamber of Commerce and the American Petroleum Institute to honor and recognize all American farmers. The young farmers participating in the awards program here have been selected as the outstanding young farmers for their states.

Spencer Chemical Co. Host To Midwest Bank Group

KANSAS CITY—Spencer Chemical Co. is sponsoring a "Farm Representative Seminar" June 1-3 in which such representatives from banks throughout the midwest will participate.

According to M. H. Straight, Spencer Advertising manager, six "Distinguished Farm Bankers" to whom awards were made during 1954 and 1955, will be present, as will representatives from a number of banking publications and business papers.

Mr. Straight commented that "There is a great story for the general public in the new concept of farm banking service, epitomized by the farm representative. . . . We propose to dramatize this profession through material in farm papers, local newspapers and local radio and television."

Croplife®

A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Midwestern states.

Plant Food Use Increases

A constantly-broadening base of distribution and use of fertilizers in the U.S. is seen in the annual fertilizer consumption report just issued by the U.S. Department of Agriculture. Compiled by Walter Scholl, Hilda M. Wallace and Esther I. Fox of the Agricultural Research Service, the report covers the fertilizer year ending June 30, 1954.

For the 15th consecutive year, consumption of primary nutrients set a new record last season. Although total tonnage was down 2.73% as compared to last year's report, consumption is still high enough to make the industry feel good about the year's business. This year's total came to 22,773,499 tons.

Other significant things to observe in the report, published in this issue of Croplife, is the gradual but continuing shift in the areas where major consumption is taking place. The middlewestern states of Iowa and Minnesota were outstanding in this regard, using 18% and 21%, respectively, more than they did in the record year of 1952-53. Iowa's consumption last season totaled 652,158 tons and Minnesota used some 322,775 tons. Not too many years ago, fertilizer materials bought by farmers in these states was negligible.

There are many reasons for this increase in the middlewest, too many, in fact, to discuss fully here. Suffice it to say, however, that the trend is for even greater fertilizer application in the years ahead.

Note the chart on page 1 of this issue. Plant nutrients have made a spectacular ascent in the past decade . . . much faster than has total tonnage risen. This, of course, reflects the manufacture of higher analysis grades which are being offered by an increasing number of manufacturers.

The grade 10-10-10 is a good example of why plant nutrient content is up. In 1952-53, some 401,079 tons of this mixture were consumed. Last year, however, the use jumped to 701,365 tons. An even more impressive record is seen in the case of 12-12-12 which in 1952-53 was consumed in the amount of 73,072 tons. Last year, its use was recorded at 208,922 tons!

By the same token, it will be noted in studying the tables, that lower analysis grades in many cases have lost ground. Grade 3-9-6, which ranked fourth in 1952-53, dropped to sixth place in 1953-54, being exceeded in tonnage by grades 10-10-10 and 4-16-16.

Thus is seen a healthy trend toward better grades of mixtures. That such a trend is to continue is pretty much assured by looking back a few years and noting how far we have come in a relatively short time. Our prediction is that analyses will continue to go higher until a much larger proportion of the total tonnage will be in this category. It naturally won't be a sudden change, because such use must come through education and year-by-year demonstration of the superiority of better materials.

Once more, a look at the plant nutrient consumption chart on page one will be reassuring. With only slight dips, it has been progressing upward since 1944 and has a good chance to keep right on for quite a while.

Naturally, some year will mark a leveling off, because nothing can keep moving upward indefinitely. But as population pressures grow in the U.S. and as more and more farm land is taken up for urban building, airports and highways, it is clear that the fertilizer industry has a big role to play in the future of America's agriculture.

All of the extra millions of people due to make up our national population a few years hence are consumers of agricultural products almost from birth to death. It puts a heavy responsibility on agriculture and its many supplying industries. It looks good for the fertilizer use potential.

No More Government Fertilizer?

That the government is "actively and unfairly" competing with private business in producing and selling fertilizer and other products, was charged in a recent report of the Hoover Commission. The group told Congress that all non-governmental facilities now operated by the government, should be taken from federal hands and be turned over to private concerns.

Specifically, the Commission recommended that the Tennessee Valley Authority be prevented from continuing to produce and sell fertilizers "in competition with private producers." It further advocated the discontinuance of all chemical research by TVA and suggested that its fertilizer research facilities should be turned over to the U.S. Department of Agriculture.

Many of us vitally interested in the welfare of the fertilizer industry can't help but applaud the principles set forth by the Hoover group. If the government is permitted to continue and expand its manufacture and sale of plant food materials, then what is to prevent its entering the pesticide business, too? Or the farm machinery business? Or the seed business? Who could then draw the line as to how much farther we would go down the road to statism?

It is a rather dispiriting prospect for the fertilizer industry to be paying taxes to help support the government's active competition against it. Things could be operated quite differently in private business if it, like government-operated enterprises, could make up deficits by appropriating tax money for the purpose.

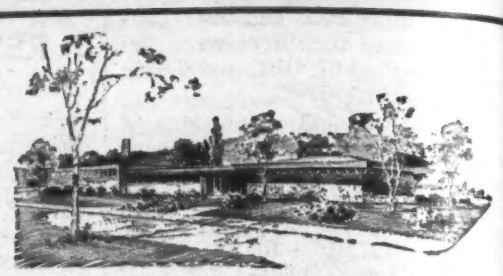
No one in private business is asking such odds, but the industry does want to be free from this type of competition. The Hoover group probably expressed the industry's feeling when it declared that "unjustified continuance (of such activities by the government) is a definite injury to the vitality of the whole private enterprise system."

(In reply to the Hoover Commission's charges, Gen. Herbert D. Vogel, chairman of TVA's board of directors, declares that TVA has only a minor role in the fertilizer business, producing only 4% of plant food value and only 2% of total tonnage. Instead of competing, TVA cooperates with industry, he says.)

Not only the fertilizer industry is interested in seeing an end to government-produced materials on the market. In presenting 22 recommendations for ending government projects, the Commission said that the defense department alone operates 2,500 business facilities, of which a thousand could be "eliminated without injury to our national defense or any essential government function."

Among these businesses are included ship-building and ship repair yards, peacetime transportation in aircraft and seagoing vessels, commissary stores and post exchanges, bakeries, coffee roasting plants, meat cutting plants, laundries, dry cleaning plants, tailor shops, clothing factories, dental manufacturers and watch and jewelry repair shops. Quite an assortment, to be sure. But of all such enterprises, the manufacture of fertilizers and its wide distribution appears to be the most ambitious of them all. It has always been the subject of heated debate and continues to be a sort of leader in this role.

We can't help but look with favor upon the prospect of fertilizer research coming under the auspices of the U.S. Department of Agriculture. It appears to be both logical and desirable and our guess is that the time is approaching when this will happen.



CROPLIFE is a controlled circulation journal mailed to those responsible for the production and distribution of fertilizer and other farm chemicals and to retail dealers of the agricultural chemical industry in the U.S. To those not on the controlled list, CROPLIFE is available at $5 for one year, $9 for two years ($8 a year outside the U.S. and possessions). Single copy price, 25¢.

●

LAWRENCE A. LONG
Editor

DONALD NETH
Managing Editor

EDITORIAL STAFF—George L. Gates, Market Editor; John Cipperly, Washington Correspondent; George E. Swarbreck, Canadian and Overseas Editor; Emmet J. Hoffman, Merchandising Editor; L. R. McDonald, Research Director; Frank W. Cooley and Roger Berglund, Assistant Editors.

●

WILFRED E. LINGREN
Advertising Director

BUSINESS STAFF—Carroll K. Michener, Chairman of the Board of Directors; H. J. Pattridge, Honorary Chairman; Harvey E. Yantis, President; Milton B. Kihlstrum, Executive Vice President and Treasurer; Martin E. Newell, Vice President; Don E. Rogers, Vice President; Wilfred E. Lingren, Secretary and Advertising Director; Thomas A. Griffin, Business Manager; Edwin J. Hartwick, Circulation Manager; James G. Pattridge, Assistant Treasurer; Carl R. Vetter, Advertising Production Manager; Peter G. Psyhogios, Classified Advertising Manager.

●

BRANCH OFFICES

EASTERN STATES—George W. Potts, Paul L. Dittemore, Co-Managers, 114 East 40th St., New York 16, N. Y. (Tel. Murray Hill 3-3768).

CENTRAL STATES—Don E. Rogers, Manager; Henry S. French, Assistant Manager; 2272 Board of Trade Bldg., 141 W. Jackson Blvd., Chicago 4, Ill. (Tel. Harrison 7-6782).

SOUTHWEST—Martin E. Newell, Manager; James W. Miller, Assistant Manager; 614 Board of Trade Bldg., Kansas City 6, Mo. (Tel. Victor 1350).

WASHINGTON CORRESPONDENT — John Cipperly, 604 Hibbs Bldg., Washington, D. C. (Tel. Republic 7-8534).

EXECUTIVE AND EDITORIAL OFFICES—2501 Wayzata Blvd., Minneapolis, Minn., Tel. Main 0575. Bell System Teletype Service at Minneapolis (MP 179), Kansas City (KC 295), Chicago (CG 340), New York (NY 1-2452), Washington, D. C. (WA 82). Cable Address: "Palmking," Minneapolis.

●

Published by
The Miller Publishing Co.
2501 Wayzata Blvd.
Minneapolis, Minn.
(Address Mail to P.O. Box 67, Minneapolis 1, Minn.)

Associated Publications
THE NORTHWESTERN MILLER
THE AMERICAN BAKER
FEEDSTUFFS
MILLING PRODUCTION

MEETING MEMOS

June 2 — South Carolina Fertilizer Meeting, Sandhill Experiment Station, near Columbia, S.C.

June 3—Fertilizer Section, Virginia State Safety Assn., Jefferson Hotel, Richmond, Va.; William C. Richardson, Southern States Cooperative, Richmond, Chairman.

June 9-11—Manufacturing Chemists Assn. and Synthetic Organic Chemical Manufacturers Assn., Annual Meeting of MCA, the Greenbrier, White Sulphur Springs, W. Va.

June 12—Executive Committee, Fertilizer Section, National Safety Council, Roanoke, Va.; Thos. J. Clarke, GLF Exchange, Ithaca, N.Y., Chairman.

June 12-15—Joint meeting, American Plant Food Council, Inc. and National Fertilizer Assn., Greenbrier Hotel, White Sulphur Springs, W. Va.; Paul T. Truitt, American Plant Food Council, 910 17th St. N.W., Washington, D.C., in charge of registration.

June 14-16—Symposium on Fertilizer Economics Research, Sponsored by Agricultural Relations Division of TVA, Knoxville.

June 21—Western Agricultural Chemicals Assn., Spring Meeting, Clark Hotel, Los Angeles; C. O. Barnard, 2466 Kenwood Ave., San Jose 28, Cal., Secretary.

June 22—Pacific Slope Branch, Entomological Society of America, Mission Inn, Riverside, Cal.

June 22-24—Association of Southern Feed & Fertilizer Control Officials, Jung Hotel, New Orleans.

June 27-29—North Central Branch, American Society of Agronomy, Summer Meeting, Ames, Iowa.

June 28-30 — Sixth Annual Pacific Northwest Plant Food Assn., Regional Fertilizer Conference, Boise Hotel, Boise, Idaho; Leon S. Jackson, 702 Lewis Bldg., Portland, Ore., Secretary.

July 5-8—Plant Food Producers of Eastern Canada, Bigwin Inn, Muskoka, Canada.

July 14-15—Southwest Fertilizer Conference and Grade Meeting, Buccaneer Hotel, Galveston, Texas.

July 20-21—Great Plains Agricultural Ammonia Assn. Midwest Trade Show & Field Day; Business Session for Members July 20 at Hotel Fort Des Moines, Des Moines, Iowa; Field Day July 21 at Iowa State College, Ames; James Andrew, Box 447, Jefferson, Iowa, Secretary.

July 27-29—Northeast Branch, American Society of Agronomy, University Park, Pa.

Aug. 8-10 — Summer Meeting of North Central Division, American Phytopathological Society, Wooster, Ohio; further information from H. C. Young, Dept. of Botany & Plant Pathology, Ohio Agricultural Experiment Station, Wooster, Ohio.

Aug. 9-11—Ohio Pesticide Institute Meeting and Field Tour, Wooster, Ohio; Dr. J. D. Wilson, Ohio Agricultural Experiment Station, Wooster, Secretary.

Classified Ads

Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15c per word; minimum charge $2.25. Situations wanted, 10c a word; $1.50 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 20c per insertion additional charged for forwarding replies. Classified advertising rate not available for commercial advertising. Advertisements of new machinery, products and services accepted for insertion at minimum rate of $9 per column inch.

All Want Ads cash with order.

HELP WANTED

MAJOR CHEMICAL COMPANY EXPANDING sales of agricultural chemicals. Openings available for experienced salesmen age 27 to 35 to be located in midwestern states. College agricultural training preferred. Address 815, Croplife, Minneapolis 1, Minn.

EXCELLENT OPPORTUNITY FOR EXPERIENCED fertilizer salesman to represent an established company in north central midwestern area. State age, education, qualifications, experience and salary requirements. Write Address 825, Croplife, 2272 Board of Trade Bldg,. 141 W. Jackson Blvd., Chicago 4, Ill.

MACHINERY FOR SALE

FOR SALE — TWO (2) 12,500 GALLON aluminum pressure tanks. Can be used horizontal or vertical. Meiners Soil Service, Colfax, Ill.

CHEMICAL & FERTILIZER FRANCHISES

Available in Midwest. Only those with technical training and working knowledge of plant food and soils need apply. Qualified persons work direct with farmers on full time basis and average $20,000 to $40,000 per year.

Write Umbaugh Agricultural Chemical Co., 3593 Central, Memphis, Tennessee, if you fit the above description and are available by July 1st.

MISCELLANEOUS

SIXTEEN AIRPLANES AND TANK trucks ready to go anywhere in the Middle West. Call collect 2-4021, day or night. Rusk Crop Spraying Co., Valparaiso, Ind.

Anti-Erosion Chemical Developed

AUSTIN, TEXAS—A new chemical spray may soon be available to combat wind erosion on millions of acres in the Southwest. The Texas Bureau of Business Research reports that such a spray has been developed by Dowell, Inc., Tulsa, Okla.

The new spray is not yet ready for commercial sale, because it will be tested in laboratory and field trials for another year. However, first tests show that it forms a thin hard crust over loose soil particles, but allows rain to percolate down into the soil.

FIRM INCORPORATES

LYNCHBURG, VA. — Fertilizer Service, Inc., a lawn spray firm, has been incorporated with capital listed at $15,000. William H. Harvey is president.

INDEX OF ADVERTISERS

TROUBLE AHEAD?

These growers are justly proud of their crop which has germinated and passed its first big test in the struggle for survival. But trouble is just around the corner. In the soil, or at the base of the plants, are early-season insect pests, ready to feed at the farmer's expense. As the plants mature, other insects will invade the field. To make a profit, this crop needs protection.

Farmers all over the world, growing a diverse number of food, feed, and fiber crops, rely on toxaphene for effective, long-lasting insect pest control. Toxaphene insecticides are now officially recommended for use against more than 200 species of destructive insects around the globe. On many crops, toxaphene is the standard insecticide for all-season control.

TOXAPHENE dusts · sprays

Agricultural Chemicals Division, Naval Stores Department

HERCULES POWDER COMPANY
INCORPORATED

931 Market Street, Wilmington 99, Delaware

Plants at Brunswick, Ga.; Hattiesburg, Miss. Offices at Atlanta, Ga.; Birmingham, Ala.; Brownsville, Texas; Boston, Mass.; Chicago, Ill.; Dallas, Texas; Denver, Colo.; Detroit, Mich.; Los Angeles, Cal.; New York, N. Y.; Raleigh, N. C.; St. Louis, Mo.; San Francisco, Cal.; Toronto, Canada

THE CHEMICAL BASE FOR TOXAPHENE IS PRODUCED BY HERCULES FROM THE SOUTHERN PINE

NX55-5